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CONTENTS.

An Asterisk (*) denotes an illustrated article.

Twelfth Annual Meeting of the American Gas Light Association—Official Notice 113

EDITORIALS—

Semi-Annual Meeting of the New England Association of Gas Engineers 113

The Truth as to the Origin of the Recent Burning of the Ferry House and Railroad Depot in Jersey City, N. J. 114

Seventh Annual Meeting of the Western Gas Association—Official Report—Concluded from page 91 115

Report of Secretary and Treasurer—Made an Honorary Member—Routine Matters—Gas Engines as Motors for Driving Exhausters—Steam-jet Exhausters—The Dieterich Furnace—Minor Matters—Report of the Committee on Final Resolutions—Adjournment.

*On the Construction of a Gasholder Tank in Porous Rock - By Wm. King 117

The English Electric Lighting Act 120

Special English Correspondence 121

The Petroleum Situation 122

ITEMS OF INTEREST FROM VARIOUS LOCALITIES 122

Gas War at Chattanooga, Tenn - To be again Represented at the Toronto Exhibition—Assessing Brooklyn's Gas Companies—Natural Gas for Heating Purposes at Washington, Pa—Tucson, Arizona Territory, Does Away with the Electric Light—And a Queer Coincidence—The New Gas Plant at Tacoma, Washington Territory—A Gas Well Ceases to Flow—Decidedly Different Statements from those in Authority—Failure of a Coke Company—American Institute of Mining Engineers—The Ellis Lever Competition Fails of its Object—Do Your Duty.

CORRESPONDENCE—

Seeking Information 124

Late Newspaper Statistics Concerning Gas Matters 125

Gas Engines and Exhausters—An Answer to "C. C. G." 125

Running an Exhauster with a Gas Engine 125

Gas Stoves on Hire 126

Careless Installation of Electric Wires 126

The Market for Gas Securities 126

To Render Corks Impervious 127

[OFFICIAL NOTICE.]

Twelfth Annual Meeting of the American Gas Light Association.

OFFICE OF THE AMERICAN GAS LIGHT ASSOCIATION,
32 PARK PLACE, NEW YORK, N. Y., August 26, 1884.

The Twelfth Annual Meeting of the American Gas Light Association will be held in Washington, D. C., on Wednesday, Thursday and Friday, dates of October 15th, 16th and 17th. The headquarters will probably be those which the Association found so agreeable when we last met in the Capital, in the spring of 1875; but on this point we cannot now speak definitely. It is expected, however, that all of the details of the meeting will be arranged in time to allow of the publication of a full programme in the next issue of the JOURNAL.

The Committee of Arrangements have already held one session in Washington, at which various matters concerning the coming event were discussed; and though, as before noted, several subjects were not definitely disposed of, the Committee felt there was every reason why the Convention of 1884 should be, in the fullest sense of the word, an enjoyable one. Certainly the surroundings of the meeting will be most propitious, for there are few cities in the Union which can vie with Washington in its attractiveness, or in its suitability for accommodating large gatherings. When to these inducements the pleasure of again meeting with one who was among the earliest promoters of the Association is added, enough is said, it is thought, to make every member strive to the utmost to be present at the Convention.

Of the literary part of the programme it may be said that though the members have not come forward with papers as promptly as was expected, there are reasons for hoping that, before the middle of October arrives, there will be a sufficiency of papers on hand to make our coming meeting instructive as well as enjoyable. We have now the promise of six papers; but I beg to say to the members that this number ought to be doubled. Again, I would endeavor to impress on each person on the roll-call of the Association his individual responsibility in this respect. Respectfully,

C. J. RUSSELL HUMPHREYS, Secretary.

SEMI-ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

The semi-annual meeting of the New England Association of Gas Engineers was this year held at North Adams, Mass., and the dates fixed upon for its celebration were the 13th and 14th days of August last. The semi-annual gatherings of the parent gas association of the United States can hardly be written down as convened for purely matter of fact business discussions, nor are they celebrated in the history of that usually staid and precise body by strict adherence to the rules and regulations originally framed for the purposes of the better government thereof. Quite to the contrary, it must be said that the mid-yearly conclave is held as a sort of relaxation from the cares of routine duty, and the furnishing of an opportunity, to be availed of by the members and their guests, for happy and pleasant mutual social intercourse. It has almost become an accepted fact throughout our land that the New Englander seems to possess, in a greater degree than the others of his fellow-countrymen, the knowledge of how to make a social gathering eminently successful; and those who have attended the delightful summer reunions of the New England Gas Engineers' Association will not be slow in saying that the Eastern gas man is thoroughly proficient in the role of playing the entertainer.

On the morning of August 13 a goodly company of gentlemen (comprising the members and guests of the New England Association), many of them having in their charge precious examples of the lovely and tender sex, assembled at the Boston depot of the Fitchburg and Hoosac Tunnel Railroad, with the end in view of boarding the 8:30 A.M. train that was to carry the party to the objective point of North Adams. A most charming ride through one of the fairest portions of Massachusetts was a fitting prelude to the day's proceedings, and 1:30 P.M. saw the excursionists safely at their journey's end. The ever genial and magnetic countenance of Mr. Frank S. Richardson, Treasurer of the North Adams Gas Light Company, and one of the Committee of Arrangements, "bobbed up serenely," and in cheery tones he welcomed the visitors; then, enacting the part of guide, he piloted the party to the Wilson House, where an elegant lunch was all displayed in tempting readiness for demolition. If the eyes had been regaled with visions of "nature dressed in choicest garb" while *en route* from Boston, the bracing air inhaled in transit certainly had the effect of creating a demand for just such a condition of things as "mine host" of the Wilson House had provided, and for which Brother Richardson may be set down as the "sure and

certain" instigator. All right, Frank; consider the matter forgiven for this once. Indeed, we are just a little inclined to say, "Well done, my boy;" and we guess all the rest of the company will join in the chorus. Lunch demolished, carriages were in readiness to convey the party to Greylock Hall, a noted summer resort some six miles due west from North Adams. The road to Greylock Hall passes through the beautiful village of Williamstown, celebrated as the seat of Williams College, and from within the enclosure of whose venerable, time-stained walls have emerged many bright-spirited youngsters whose subsequent course in life's battle has served "many a time and oft" to uphold the dignity, honor, and reputation of their *alma mater*. Greylock Hall is well provided with every facility for the enjoyment of its guests, and many and various were the sports indulged in, thoroughly appreciated both by old and young. Some one or two of the party proved themselves great experts at rolling ten-pins; but, then, we will respect their modesty (Oh, how modest they are!), and not chronicle their names.

Dinner was served at five o'clock—Greylock saw a hungry sight—and the next hour and a-half was spent in sight-seeing, which task was rendered agreeable from the "toning down" of the sun's rays. A few of the younger folks, we fear, were inclined somewhat toward sentimentality; and it strikes us that, whether owing to the softening influences of the deepening twilight or not, many of the "waist places" were supported in the old orthodox manner. These reveries were interrupted by the re-appearance of the carriages which were summoned for the return trip to North Adams. It was "on the card" that there should be held a sort of business meeting on Wednesday evening; but we fear that the fates, together with the ladies and Frank Richardson (again a culprit), are to be charged with the frustration of the well-intentioned scheme. The way it came about was something like this. Frank had engaged the services of a splendid band, who welcomed the party on the return to the Wilson House, with a terpsichorean measure that proved irresistible in its attraction for the ladies of the party. Frank probably put them up to the thing, for they ably argued that while business "would keep," dancing would not; and, as a matter of course, who could resist their pleadings? The Wilson House contains a spacious saloon, often used for concerts and the like; to this apartment all hands repaired, and soon nimble feet were gliding to the "strains of fairy music falling." It was a noticeable fact that the elders of the party seemed to have "new life put into their heels" from witnessing the zest with which they entered into the fun—not alone from the way they entered into it, but more from the time they kept it up. On the morning of Thursday another carriage ride was devoted to a trip over the Green Mountains, which was little else than a continual succession of magnificent panoramic surprises. About half-way up the mountain side a spring of delightfully pure, cool water was encountered. "And thereby hangs a tale," for the importance of the discovery was augmented by the appearance of, if not the original, a very fair representation of Jacob and Rebecca of "olden times gone by," who were in attendance to dispense the life-giving fluid. (We wonder if Frank had anything to do with this.) Jacob, in his primitive manner, or for the want of any better means of doing it, had twisted up a large piece of bark and used it as a cup—with this substitute (and a good one it was) did the fair Rebecca serve the sparkling liquid to all the thirsty throng. The mountain top reached, sufficient time was spent in "admiring nature from her topmost heights," when the excursionists once more wended their way to North Adams. Dinner was then the proper thing at the proper moment, after which an informal meeting of the Association was called to order. In the absence of the Chairman, Mr. Geo. D. Cabot was called to preside, with ever-ready and reliable Geo. B. Neal recording. A hearty vote of thanks was tendered to the representatives of the North Adams Gas Light Company, and to Mr. Frank Richardson in particular, for the hearty and generous treatment accorded the Association's members and guests while on their visit to the locality. Short and pithy speeches consumed the time remaining until train hour for Boston had arrived. To the Committee of Arrangements, consisting of Messrs. F. S. Richardson, J. H. Rollins, John Andrew and Geo. B. Neal, all praise is due for the happy and complete style in which everything was conducted. Their untiring and successful efforts, to make this semi-annual meeting the grand affair it proved to be, were amply appreciated by every one who had the good fortune to participate therein.

The Truth as to the Origin of the Recent Burning of the Ferry House and Railroad Depot in Jersey City, N. J.

[Mr. Jno. W. Newell, Secretary and Engineer to the New Brunswick (N. J.) Gas Light Company, under date of August 26th, sends us the following in relation to the real causes which led to the destruction of the ferry house and waiting-rooms of the Pennsylvania Railroad Company's depot in Jersey City, N. J., on the night of August 10th. As stated by Mr. Newell, the electric light purveyors were not slow in spreading broadcast the assertion that the conflagration was occasioned by an explosion of a gas tank used for storing illuminating gas under high pressure. While an explosion of illuminating gas did certainly take place, the electric current appears to be rightfully chargeable with having been the primal cause leading to the subsequent destruction.]

There has been a considerable cloak of mystery thrown over the origin of the fire that recently consumed the Pennsylvania Railroad Company's ferry houses in Jersey City, and many erroneous and misleading statements have been made in regard thereto; and, now at this date, careful inquiry reveals the fact that one of these statements was made "out of whole cloth," inasmuch as it has been shown that there was no explosion of a gas tank, nor was the gas tank in any way injured, for it remains intact. This theory was among the foremost of those advanced, and was also the one most pertinaciously adhered to.

The space intervening between the passengers' waiting-rooms and the bridges or floats to which the ferryboats are fastened—some fifty or sixty feet in width, and several hundred feet in length—was nothing else than a mere platform, built upon piles or trestlework, and elevated above the surface of the water at a height of from ten to twenty feet, the elevation varying with the state and strength of the tidal flow. Underneath this platform or wagon way were stretched thousands of feet of iron gas pipes running in almost every conceivable direction; and these conduits, owing to the frequent jarring occasioned by the constant landing of the ferryboats, the rolling of heavily loaded vehicles, combined with the more or less infirm construction of the platform, were continually subjected to abnormal strains. As a consequence gas leakages often happened, and the large area of space below the platform afforded an excellent receptacle for the collection of an explosive mixture of air and gas, such collection requiring but the aid of contact with a naked spark or light to cause exactly the results that were witnessed on the night in question.

Now, as to how the dangerous contact was really effected. Underneath this same platform were distributed hundreds of feet of electric wires, and from one of these electrical conductors was generated the spark that ignited the explosive mixture retained below the wagon way. The resulting explosion severed the main pipe leading to the storage tank, from whence is taken the supply of gas for lighting the cars. On this main pipe leading from the forcing pump, situated some hundreds of feet away, there was a pressure of 260 pounds to the square inch, and the highly compressed gas in this main pipe, supplementing the many thousands of cubic feet of gasified air beneath the roadway, rendered destruction certain and complete. To the bursting of this main should, no doubt, be attributed the second explosion which was noted; but, according to newspaper evidence, this was really assigned to the fracture of the meter.

The ordinary pressure carried by gas companies in their distributing operations is only about two ounces to the square inch, and it might be well to explain that the high pressure of 260 pounds—sometimes it went up to 300 pounds—carried on the ferryhouse main was for the purpose of compressing the gas into a compact and convenient state wherewith to charge the tanks carried under the railway cars, and also to furnish the necessary pressure for conveying the lighting agent to the burners when turned on in the ordinary way.

It has also been claimed that the explosion originated from the striking of a match employed to ignite a gas jet. As the fire occurred at 11:20 P.M., and the gas had consequently been burning for some hours before, it would seem an impossibility that such action can be considered a likely cause. In the judgment of the writer the explosive mixture of gas and air was ignited by one of the electrical conductors running below the platform; and this theory is amply borne out from the fact that all the motions of the explosion were upward, showing that the power came from below. How could the lighting of a match above the wagon way set off an explosive mixture contained underneath it? The plain conclusion is, from a survey of the whole chain of attendant circumstances, that had there been no electrical conductors beneath the platform there would have been no explosion.

It has been the customary practice with electric illuminating, telegraph, and telephone companies to attach a wire to *any* gas pipe (that may be conveniently at hand) for the purpose of carrying off any *surplus* current which at times may be found in circuit; this practice, it is almost needless to add, is both pernicious and dangerous. As an instance of the harmfulness of the plan, I might relate the following: Not long since, at the railway depot in this city, an electric wire was attached to a gas service pipe, with the object of doing what is specified above; when the "surplus-electricity" point was reached, the said "surplus," while on its way to the ground, melted the leaden connections of the meter, and an explosion followed. Owing to the presence of mind displayed by one who was near by at the moment—an operation attended with no little personal danger—the gas was turned off and a conflagration averted. Since that occurrence the "surplus" wire has been connected to the earth by a separate conductor. The meter referred to is now at the office of the New Brunswick (N. J.) Gas Light Company, and its appearance bears conclusive evidence as to the manner and cause of its destruction.

[Official Report.—Continued from page 91.]

Seventh Annual Meeting of the Western Gas Association.

Held at the Southern Hotel, St. Louis, Mo., May 14, 15, and 16, 1884.

Second Day—Afternoon Session.

REPORT OF SECRETARY AND TREASURER.

When the discussion on Mr. Lansden's paper was completed, the President announced that the Association was ready to receive the annual report of the Secretary and Treasurer. Secretary and Treasurer, Mr. A. W. Littleton, then presented the following figures as embracing an account of the receipts and expenditures for the past year:

Receipts.

Cash on hand May 1, 1883	$209 80	
Initiation fees received	250 00	
Yearly dues received	222 00	
		$681 80

Expenditures.

Stenographic report of proceedings, session of 1883.	$165 00	
Secretary's salary	150 00	
Printing, stationery, etc.	94 75	
		$409 75
By balance, cash on hand		$272 05

Mr. T. A. Cosgrove, from the special committee appointed to audit the accounts and books of the Secretary and Treasurer, reported that the above figures were examined and found to be correct. The committee further reported that, in view of the great amount of routine work performed by the Secretary, they would recommend that the Association recognize the wisdom of the policy of increasing the salary attaching to the office, so as to make the remuneration in some measure commensurate with the entailed labor.

On motion of Mr. Gimper, the report was received and accepted. Mr. Decker then moved that, in accordance with the suggestion made by the Committee of Audit, the salary of the Secretary be increased to $200.

Mr. McMillin—That may be a very liberal percentage of increase; still, in my opinion, the proposed new figure appears very illiberal. I suggest that the salary be placed at $250.

Mr. Decker—In explanation of why I named $200 as the new salary rate, I will say that, from listening to a reading of the report of our present financial standing, we do not appear to be possessed of an extra large cash balance; and, further, if we decide to publish the past and present proceedings of the Association in book form (an idea that I am heartily in favor of) we will require to have the cash on hand wherewith to foot the printer's bills. Then, again, I think the Secretary is just as deeply interested in the success and development of the Association as any other one of us, and I also think he is willing to take, as a partial recompense for his services, what we feel able to give. I know that the sum named by me is one not at all commensurate with the services rendered; but it is a question with me whether we can afford to offer a greater one. However, I will accept the suggestion advanced by Mr. McMillin, and amend my motion so as to make it read that the salary be increased to $250.

The President—Before placing the motion before the Association I will state, on behalf of our Secretary, that I feel that a large portion of the success which has attended the efforts of this organization is due entirely to him, on account of his untiring zeal and activity in its behalf. Secretary Littleton will readily understand that the Association, in fixing the salary at $250, does not offer this sum as a nearly adequate compensation for his labors, but merely to show that it recognizes and appreciates his energy. (Applause.)

The motion to increase the salary to $250 per annum was then put before the members, and carried without a dissenting voice.

MADE AN HONORARY MEMBER.

After Mr. Lansden had moved that it be the sense of the Association that those gentlemen who had been assigned to read papers before the Convention, but who had not yet reached St. Louis, be permitted to publish their communications in the American Gas Light Journal as a part of the "Official Report," Mr. J. Gimper took the floor and moved that Mr. Joseph R. Thomas be elected an honorary member of the Association. The motion being put and carried, the President said, "Mr. Thomas, we are heartily glad to accept you as an honorary member of our Western Gas Association."

In response to this announcement Mr. Thomas thanked the President and members for their hearty and spontaneous action, and assured his auditors that the honor conferred upon him was thoroughly appreciated. He spoke of the great good that had accrued to the profession from the formation of these associations of gas engineers, and predicted that the good results which had already been placed upon the record, as the outcome of their past labors, would be eclipsed by those which the future had in store. He also alluded to the position maintained by the Journal in regard to the question of gas manufacture, and hoped his auditors would not neglect to send along anything of interest that happened in their localities, in order that all might be "posted" as to what was going on.

ROUTINE MATTERS.

The President appointed as a local committee to take charge of arrangements for the annual meeting of 1885 (to be held in the city of Chicago, Ill.) the following gentlemen: Messrs. E. L. Brown, P. T. Burtis, and Henry Pratt.

The Committee on President's Address recommended that the thanks of the Association be tendered to President J. B. Howard for his very able and entertaining inaugural address, and suggested that the same be incorporated in the report of the proceedings of the Association. The recommendation and suggestion were adopted.

Mr. McMillin inquired as to whether any motion had been made to print the proceedings in book form. The President answered in the negative. Mr. McMillin then asked the Secretary if he could estimate what would the probable cash balance on hand be when the annual dues had been collected. Secretary Littleton replied that the expenses for the ensuing year would be somewhat greater than those for the twelvemonth just expired. He was of the opinion, however, that the balance would be in the neighborhood of $250.

Mr. Decker then moved that a committee be appointed to inquire into the matter of publishing the proceedings of the Association in book form. This motion gave rise to a lengthy discussion as to the advisability of incurring this expense; and after every phase of the question had been argued, Mr. Moran suggested that the entire subject of the debate be indefinitely postponed, and moved that the question of publication be laid upon the table. This motion was agreed to.

Mr. Hyde here asked the President as to the course to be pursued in reference to the passage of resolutions of thanks for the many courtesies extended to the Association by various citizens of St. Louis. The President replied that he thought this would be a proper time to take the matter in hand. Mr. Scofield moved that the Chair appoint a committee on final resolutions. The motion was carried; and the President appointed Messrs. L. K. Scofield, G. A. Hyde, and T. A. Cosgrove as such committee.

GAS ENGINES AS MOTORS FOR DRIVING EXHAUSTERS.

Mr. McMillin—As there does not seem to be any further routine business likely to occupy the attention of the members (at least for the present), I would like to ask whether any gentleman in the room has witnessed an exhauster doing active work that was driven by a gas engine. Since I have been somewhat active of late in calling the attention of our small manufacturers—meaning those who require the use of light motor powers in carrying on their different pursuits—to the advantages of the gas engine, I would like to say, as a "clincher" to the argument, that I am using one myself.

The President—I, for one, can state that I have seen an exhauster run by a gas engine, and with every appearance and indication of success. When on a visit to Denver, Col., some two or three years ago, I called on Mr. Fay, who is engineer to the gas works at that place; and it was there, while inspecting the Denver plant, that I beheld a gas engine furnishing the power to run an exhauster. The gas engine was only operated in summer, as it was necessary to maintain steam power during the winter. Mr. Fay said that he had never experienced any trouble in its use, and was perfectly satisfied with the results.

Mr. McMillin—Can you state how the speed of the engine was varied to correspond with the fluctuation in make of gas?

The President—They had in use a peculiarly constructed governor, which was the invention of Mr. Fay himself. As it is so long ago since I was there, I would not like to make the attempt at giving a description of it from memory. Mr. Fay said it answered every purpose.

Mr. Ramsdell—I have not seen this governor, but I have heard about it. I think the governor shifts the cone pulleys in regulating the desired speed.

STEAM-JET EXHAUSTERS.

Mr. Highlands—Desiring information on a certain point, I would like to inquire if it would be economical to use a steam-jet exhauster in a small works.

Mr. Watts—Some six or seven years ago, while operating a plant of limited size at San Antonio, Texas, I put in a steam-jet exhauster and kept it working for two or three years. When running to our fullest capacity we operated but three benches; and as the difference in yield amounted to only 5 per cent., and we could get from 20 to 25 cents a bushel for coke, the conclusion reached was that no real practical economy followed the employment of the exhauster, and its use was discontinued.

Mr. Coverdale—I cannot agree with Mr. Watts in the statement made by him. I have used several steam-jet exhausters, and my experience is in direct opposition to that given by the gentleman who has just spoken. I should say that steam-jet exhausters should prove a benefit to small works for this reason: Suppose the make is increased in but a small ratio, and the gain accruing from that direction be comparatively trifling; look at the saving obtained in the prevention of carbonaceous incrustations from forming in the retorts—this item alone should insure their use, even though there might not be any increased yield at all. Then, again, it should be borne in mind that back pressure is obviated. I have been connected with a number of small companies (some of them even smaller than the San Antonio plant spoken of by Mr. Watts), and am a thorough believer in the idea of the usefulness of the steam-jet exhauster for such plants. I erected a works at Muscatine, Iowa, and one at Colorado Springs, Colorado, and put the steam-jet exhauster in both of them; and I feel quite sure that neither of these places would now agree to dispense with their use.

Mr. Highlands—The point I am after is this: In one small works that I have under my charge only two benches of threes are worked. I regret to say that my labor is not very intelligent, and the back pressure is sometimes run up to 6½ or seven inches. Now, as a matter of course, what I am desirous of getting at is—will it be economy for me to put in a steam-jet exhauster? If I put in a steam-jet exhauster will it clog up my purifying house and connecting pipes with naphthaline, or will it not?

The President—What is your annual make?

Mr. Highlands—About five million cubic feet.

The President—If I may be allowed to speak, possibly I may be able to throw some light on Mr. Highland's request for information in regard to the economy of the policy of employing steam-jet exhausters in small works. To begin with, I will give it as my firm conviction that engineers in charge of plants whose annual output reaches the figure given by Mr. Highlands will find economy in using the appliance. The expense for fuel is comparatively nothing; in fact, a works having an annual output of five millions ought to make enough breeze wherewith to keep up the steam. I have been using a steam-jet exhauster for over five years, and my annual output has varied from 20 to 25 millions. I must say that I prefer a steam-jet to a rotary exhauster even for a works of that magnitude. In the first place, it does not require one-tenth the care that a rotary does; in the second place, beyond question there is an increase of from one to one and a-half candles in the illuminating power of the gas. Then there is the ease of its manipulation. My men very seldom find any necessity of even looking at it. I was occasioned, during the period I have had it in use, to make repairs but twice, Once I had to renew a glass plate, and again to replace a steam valve that had become worn away to the point of allowing too much steam to pass. In regard to stoppages, where poor coal is carbonized naphthaline is liable to cause some bother. I have had trouble from this source; but, through an arrangement of my own devising, the trouble never becomes a serious one. We sometimes have to clear a certain portion of the pipes to the purifiers; but I have never had a stoppage at the meter inlet. In conclusion, I would repeat what I said at the commencement of my remarks, which is simply that a works producing five millions annually will undoubtedly find advantage in installing an exhauster, be it either a steam-jet or a rotary.

Mr. Coverdale—Exhausters may profitably be used in any town that is supplied with water furnished under pressure. I am interested in a gas works located in a certain township; the place is a small one (although it has a very complete system of water-supply), as may be imagined when I say that the annual send-out of gas is but twelve millions. I do not know as the practice there followed may possess novel features to many of you, but they take the feed water direct from the water works to the boiler. The boiler is a small upright one, only 24 inches in diameter, and 6½ feet high. At the top of the boiler, just where the chimney stack goes up, there is a sort of a dome, and inside of that dome is placed a coil of pipe. The feed water enters that dome, passing through the coil of pipe and down the other side to the bottom of the boiler, into which it is admitted through a small opening. The temperature reached by the water before entrance into the boiler is in the neighborhood of 200 degrees, and all this means that a very slight expenditure of fuel is necessary to generate the steam wherewith to run the steam-jet exhauster. A similar plan could be followed in other small places possessing a water works plant. I know of a case where a steam-jet exhauster was put in, and the photometer showed that the illuminating power of the gas had been increased by from one to 1½ candles; with the further advantage that carbon formations in the retorts, which used to be a source of almost continual annoyance, were entirely done away with.

Mr. Highlands—I asked these questions with a wish to gain the information elicited, and must return thanks to the gentlemen for their extreme kindness in imparting the results of their experience. At the risk of being considered troublesome, might I inquire of the President as to how he overcame the naphthaline stoppages?

The President—I have with me a rather imperfect drawing of the device used, but I will try to explain how it is placed, and how it operates, to the best of my ability. Here (indicating) is the retort house, in which I have placed the steam-jet exhauster at a distance of about twelve feet from the hydraulic main. The main pipe leading from the exhauster runs down into the ground and out to, along, and underneath the sidewalk into the purifying house—a distance of some eighty feet. The gas then passes up and down the pipes of the combined washer, and next goes on to the air condensers. In these air condensers the naphthaline most generally shows itself. There is a cast iron box of that form (referring to the diagram) running the entire length of the condenser. I tap a pipe into the hand-hole of this box, and also run a pipe underneath, so that I have two provisions against the seal being affected by the naphthaline deposits. When a stoppage occurs, as can readily be told by a glance at the pressure gauges, which are placed at intermediate points and at the ends, a steam pipe is attached to two or three places connecting with the iron box. The moment the steam is let in the naphthaline softens, passes down and comes to these pipes (indicating) forcing itself into the water, where it soon becomes solidified, and it is but the work of a few moments to shovel it out.

Mr. Highlands—Is the formation of naphthaline invariably connected with the installation of a steam-jet exhauster?

The President—To be frank with you, I did not know what naphthaline was until I put in the steam-jet exhauster; still, I can always take care of these naphthaline deposits.

Mr. Odiorne—I would like to state that at Springfield, Illinois, we have employed a steam-jet exhauster for 16 years. During our first years of operation we worked native coal, afterwards carbonizing Pittsburg coal. We do not have much occasion for complaint on the score of naphthaline deposits.

The President—I will state, as far as my observation on the subject goes, that those carbonizing native coal, and employing steam-jet exhausters, do not know what naphthaline is.

Mr. McMillin—The coal is not rich enough?

The President—No, sir.

Mr. Watts—I am inclined to consider the idea of employing a steam-jet exhauster, while carbonizing Youghiogheny coal, a very serious matter.

The President—I do not agree with you. It would depend on circumstances. In my case, as also in that of others known to me, the results are not very grave.

Mr. Runner—I have used a steam-jet exhauster for three years. It appears to me that these naphthaline troubles arise in great part from purely local causes—and might be traced to exposure, climatic conditions, heats at which the retorts are run, etc. I have never been troubled with naphthaline in my purifying room, and only once did a stoppage traceable to such a body ever happen in any of the connecting pipes. During October of last fall the inlet to the meter became clogged, and I was at a loss to account for the cause. Investigation pointed to naphthaline, and steaming out effected a complete cure. The trouble has not since been renewed.

Mr. Starr—The only naphthaline deposit that happened at our works occurred last fall. One afternoon we found the inlets to both holders had suddenly stopped up. The case looked somewhat serious; but an application of steam soon set things going smoothly.

THE DIETERICH FURNACE.

The President—The Chair has been requested by quite a number of members to call upon Mr. Slater in reference to the matter of the Dieterich furnaces and Davison retorts. If it be not asking too much, I know that all present would listen with a great deal of pleasure to any remarks that Mr. Slater might make in regard thereto.

Mr. Slater—I will say, Mr. President and gentlemen, that much success has attended the introduction of the Dieterich furnace at the main works of the Providence Gas Light Company. We can claim no merit to ourselves for this success; and whatever merit attaches to the system is entirely due to Mr. Dieterich himself; we have simply followed out his instructions. There is no secret concerned in the construction of this furnace; there is nothing connected with its management that is difficult to understand; and why it is that it should not have succeeded at other plants than ours is a conundrum to me. In regard to this, though, I remember Mr. Dieterich mentioned, while at one time in conversation with me, that if a man has got a spirited horse, he also needs a good driver to handle him; should a careless trainer be placed in charge the horse will not be apt to do well. So it is with the Dieterich furnace; if it receives proper care and attention there is no need of having any trouble in its working. The results accomplished so far at Providence have been published in the American Gas Light Journal, and quite probably you have thus been familiarized with them. I think, however, that I have some figures bringing the results down to a later date. Some few weeks ago I was asked how we were doing with the system, and I went over the figures for the period between January 1st and April 30th, the figures being the monthly averages; and, as a sample of them, I will

give the following: The lowest yield per retort, for any one month of the period in question, was at the rate of 10,388 feet in 24 hours; the largest yield for any one month was 11,637 feet. Of course it is understood that Mr. Dieterich advises the working of three-hour charges at the several plants where the furnaces are in operation. When first starting the furnaces some two and a half years ago we instituted the three-hour system; then as a contrasting experiment we tried four-hour charges. The experiment lasted only two or three days—the result being that we adopted three-hour charges, and have adhered to these ever since. We have had no trouble with the furnace, nor with standpipes, hydraulic mains, etc. I might qualify the statement in regard to the connections by saying that no more trouble is experienced with these than when employing the old-time furnaces. If the gentlemen have any questions to ask I will try to answer them.

Mr. Highlands—I would like to ask what the dimensions of the retorts are?

Mr. Slater—The retorts are known as the Davison retorts. When we speak in the East of the Davison retorts we acknowledge that we are on rather a tender subject. In fact, as the Yankees say, Eastern engineers, as a rule, are not disposed to take "any stock in them." This would appear borne out by the statement that several works, after a trial of these carbonizing vessels, abandoned them. Still, I suppose our works may be relied upon to furnish the usual exception. It is now some four or five years since we put in the Davison retort, and, with the exception of one or two small orders, we have not used any other kind since commencing their use. I might say that the results mentioned by me were obtained by the combined employment of the Dieterich furnace and the Davison retort. For the benefit of those who have not seen these vessels I will say that the Davison retort is one with three ribs—the first rib situated about 2½ feet from the mouthpiece, the second in the middle, and the third toward the back end. The retorts now used are set in arches that were originally built for ordinary benches of sixes. The dimensions are 14″ × 26′ × 7′.

Mr. Runner—How much coal do you use at a charge?

Mr. Slater—We use from 250 up to 290 pounds, according to circumstances and the sort of coal. I think the average weight of our charges during the last 2½ years—I speak entirely from memory now—would be in the neighborhood of 275 (perhaps 280) pounds. I will not say positively, but I think we carbonize now 25 per cent. more coal than we did with the old furnaces and retorts.

Mr. Lansden—I would like to say that at the works of Mr. Stiness, at Pawtucket, four-hour charges are adhered to. Do you know why he should follow a practice different to yours? Why this difference should exist between your practice and his, I submit, rather puzzles me.

Mr. Slater—Mr. Stiness has got some Davison retorts at work.

Mr. Lansden—Well, I should like to know the reason (presuming Mr. Stiness has given one) why, both of you employing the same style of improved furnace, there should be an hour's difference in the time of carbonization.

Mr. Slater—I think if Mr. Stiness were here present he would say substantially what other engineers have said while running the Dieterich furnace—that he had more trouble from stoppages, etc., did not run quite as smoothly, when running on three-hour charges.

MINOR MATTERS.

Mr. McMillin—I have had a little trouble with one of my consumers in regard to a rather peculiar matter. This consumer resides at a distance of about two miles from our works, and he complains of a deposit of a sooty-looking substance that collects around the tops of his burners and diminishes the light. This accumulation takes place very rapidly, and he is frequently afraid to turn the light down, for fear it will be extinguished. He was originally using an iron fishtail burner, but a resort to other forms of burners did not appear to check the difficulty. This has been going on for some two or three months. Perhaps, as the location is in a beer saloon, there may not be sufficient oxygen in the place to burn up the carbon. (Laughter.) Other saloons in the town are not similarly afflicted.

The President—Is the house on an elevation?

Mr. McMillin—It may be in a position some 10 or 15 feet higher than the elevation of the gas works. I would like to know if anyone else present has experienced a similar circumstance.

The President—As the members do not appear to be possessed of information on the topic, we will probably have to consider that the case is peculiar to the city of Columbus, Ohio.

Mr. Haselmyer—In the Springfield (Ill.) watch works, with which establishment I am connected, new burners have to be put in every three or four days in the rooms devoted to the gilding department.

The President—What description of burners do you use?

Mr. Haselmyer—Common lava-tipped burners. The destruction of the burners is probably due to the effect occasioned by the use of large quantities of muriatic and nitric acid employed in our business.

REPORT OF THE COMMITTEE ON FINAL RESOLUTIONS.

The Committee on Final Resolutions then presented their report:

Gentlemen—Your Committee on Final Resolutions respectfully submit for approval and adoption the following:

Resolved, That this Association recognizes the ability of its worthy President, Mr. J. B. Howard, in the able, impartial, and efficient manner in which he has presided over its deliberations during the year just closed.

Resolved, That the thanks of this Association also be and are hereby extended to Secretary A. W. Littleton for the very efficient manner in which he has conducted the business of this Association, and congratulate him and ourselves upon his untiring perseverance in building up its interest in a way that has added so much to its success.

Resolved, That the thanks of this Association are due Mr. C. P. Warner, Manager of the Southern Hotel, for the courteous and princely manner in which he has entertained the members during their stay in the city of St. Louis.

Resolved, That to the Local Committee of Arrangements, and to the good citizens of St. Louis who have aided them with their time and hands, who have been so untiring in their efforts to make pleasant our sojourn in their city, are due our most hearty thanks; and we desire to place on our records that words fail to properly express our gratitude and appreciation of the valuable services rendered by them to the members of this Association.

On behalf of the Committee,

T. A. Cosgrove,
G. A. Hyde.

The resolutions were unanimously approved and adopted. The Chairman then announced that the business portion of the proceedings of the Seventh Annual Meeting of the Western Gas Association had terminated, the gavel fell, and the meeting was declared adjourned.

May the Western Gas Association be as prosperous and progressive in the future as it has been in the past.

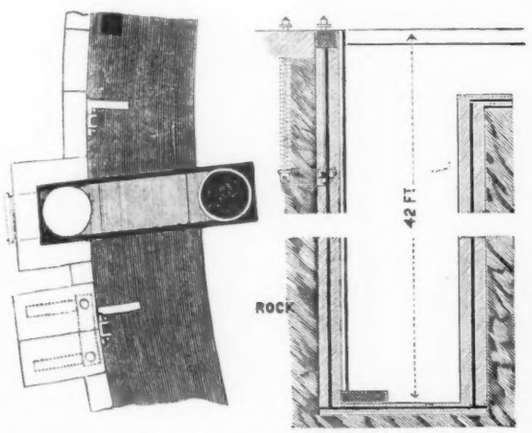
On the Construction of a Gasholder Tank in Porous Rock.

By William King, of Liverpool, England.

[A paper read by the author before the Twenty-first Annual General Meeting of the Gas Institute, and reprinted from the London *Journal of Gas Lighting*.]

In accordance with a request made by the President and some of the members of the Council, the following account has been prepared of the construction of a gasholder tank, for the Liverpool United Gas Light Company, in the new red sandstone formation; and, as the circumstances of the case were somewhat unusual, it was considered that a description of the work might not be uninteresting to the members.

In consequence of the rapidly increasing demand for gas at the south end of Liverpool, it was found absolutely necessary to increase the gasholder accommodation in that locality. Considerable difficulty and delay took place before possession of a suitable piece of land could be obtained; and it was not until Jan. 15, 1883, that the contractors were enabled to commence their work.



Gasholder Tank.—200 feet diameter.
Liverpool United Gas Light Company—Grafton Street Station.

The piece of ground on which the tank has been constructed is situated on the slope of the hill which forms the district known as Toxteth Park. The first work to be done was to reduce the ground to a level surface; and, in order to accomplish this, about 7,800 cubic yards of rock had to be re-

moved. The whole of the tank had, therefore, to be constructed in new red sandstone rock of an exceedingly porous nature, and entirely free from water. The very extensive use of asphalt in railway and other works had attracted the author's attention; and, after due consideration, it was determined to render the tank water-tight by means of this material.

The finished dimensions of the tank are 200 feet in diameter, and 42 feet deep, measuring from the brick bottom of the tank to the upper side of the stone curb. The diameter of the core is 184 feet.

A circular trench, 11 ft. 2 in. in width, as shown on the section, was first excavated to the required depth; the rock on both sides of the excavation being carefully "sawn" by picks, so as to present a perfectly true and perpendicular surface ready for the reception of the brickwork. The mass of rock between the two faces was removed by blasting. No water was met with in carrying out the work. The rock in which this work has been executed is so porous that if water were poured upon it, or heavy rain fell over the surface, it would immediately disappear. A recess in the side of the tank and core, and in the bottom of the tank, in the position shown on the drawing, was made to receive the inlet pipe, the wall of the tank being carried round the excavation. The level of the top of the core was also reduced to about 3 feet below the average ground level. On the completion of the excavation the bottom of the tank was covered with a course of dry brickwork (the joints being left rather open); and the whole was then covered with a layer of asphalt about 1 inch in thickness, completely filling all the vertical joints, and spreading over the surface of the bricks.

On the sides of the core and tank respectively a wall of brickwork 9 inches in thickness was constructed in Portland cement; the bricks being placed in contact with the rock. This wall was carried up in rings of from 4 to 5 feet in height; and as each section was completed another ring of brickwork of similar thickness was built within it. This inner ring was carried up two courses at a time, a space of an inch being left between the two walls or rings of brickwork, to be filled with asphalt. It was found desirable to pour in the asphalt at every two courses, so that the upper surface of each layer of asphalt might be thoroughly cleared from any sand or cement that chanced to fall on it during the execution of the work. By taking this precaution, a perfectly uniform sheet of asphalt was carried down the outer wall of tank beneath the bottom, up the side, and along the top of the core; forming a continuous skin or water-tight layer. The surface of the core was constructed in the same manner as the bottom of the tank—viz., one course of dry brickwork covered with asphalt, and then the asphalt was protected by another course of brickwork laid over it in Portland cement.

In consequence of the urgent need for the tank and gasholder, the work was carried on continuously day and night. A 2-inch main was run in a temporary manner round the excavation, and branches were carried down at various points; ample illumination during the night being thus afforded. The contractors obtained possession of the ground on Jan. 15, 1883; the excavation was finished on the 9th of April following, and the brickwork was then immediately commenced. The whole of the tank was completed, including the base stones for the columns, the top curb, and the resting stones for the gasholder (at the bottom of the tank), on June 16; so that only 152 days, including Sundays, were occupied in the execution of the work.

The gasholder consists of two lifts of 40 feet each. The inner lift was commenced early in June, and was handed over by the contractors ready for work on the 29th of September. Water was first run into the tank on the 7th of September; and on the 26th of that month the tank was full. On that day the gasholder was tested with air, and found to work satisfactorily; gas being first turned into it, and the holder used for the supply of the public, on the 18th of October—or 276 days from the date of obtaining possession of the land. It could, however, have been used, in case of absolute necessity, nearly a fortnight before that date.

The use of asphalt in constructing the tank has proved perfectly successful; the loss of water, even from the first, being hardly appreciable.

The tank has lately been emptied to admit of the construction of the outer lift of the gasholder. This is expected to be finished in the course of a month from the present time; but as there are no unusual features with regard to the gasholder (which is without a trussed roof framing) it has not been considered necessary to allude to it.

When the gasholder is empty the roof is supported by a number of cast iron columns placed on the core; the tops of these columns being connected together by bars of flat iron. There is only one pipe to the gasholder. This is constructed of cast iron, with faced joints and internal flanges. The suction-pipe of the syphon pump is placed within the gas pipe.

Discussion.

The President said he should be glad to have the experience of any members in the construction of what might be termed abnormal tanks. This was a description of tank not common in England; but there were in various parts many others which had to be erected under special circumstances; and if any gentleman present had had to construct such a tank, it would be useful to give particulars of it, although it might not be similar to the one constructed by Mr. King.

Mr. W. Foulis (Glasgow) asked Mr. King whether he had thought, having solid rock to deal with, of making the tank water-tight by simple rendering without brickwork. He understood the surface of the rock was carefully chipped or picked. He had seen tanks cut in rock made perfectly tight by rendering with Puzzolana cement, which was more difficult to work with than ordinary Portland cement; but in such a case as this, unless the rock was full of fissures, he thought the tank might have been made perfectly sound, at much less expense, without any brickwork at all.

Mr. J. Miles (Boulton) asked if Mr. King could give the cost of construction of the tank; and also the comparative figures as to cost, compared with a tank built in the rock in the ordinary manner. He should also like to know whether the tank was perfectly tight at the present time.

Mr. W. Fiddes (Bristol) said in all the tanks he had made he had never used puddle, but built them of stone set in hydraulic mortar. He always used hydraulic lime made from blue lias, which formed excellent mortar; and every tank which he had built (of which there were ten or twelve) was as tight as a bottle. They were tested before erecting the gasholders, and he generally found that there was a little absorption at first, but after that they were perfectly tight. His reason for adopting stone was because no bricks fit for the purpose could be obtained nearer than about 20 miles. The bricks of the neighborhood were all very porous, and contained a great quantity of lime. There were only two instances where he had built tanks in rock; and in these cases one-half the circle was in rock and the other in silt (a tidal deposit). The rock was of the kind known as millstone grit; the stone used for building the tanks was Pennant; and all the tanks were lined with 9-inch brickwork set in hydraulic mortar.

Mr. Denny Lane (Cork) said that, in his city, they also found that the bricks contained lime. He had one tank, 60 feet in diameter, built in grey limestone, which was full of fissures. Originally there were apertures of ancient form, looking like ancient water channels, and varying in size from 2 inches to some feet. The tanks were built of stone which had been excavated from the tank. There was no hydraulic lime in the south of Ireland; and they therefore imported it from the Welsh coast, and it was burnt on the wharf. The inside was rendered with a good coating of Portland cement. At the bottom of the tank they carefully excavated the sand out of these circular cavities; and filled them up with strong concrete. They then put a layer of small slates laid in cement. He should mention that, during the construction, some considerable streams arose from the bottom of the tank; and these they had to conduct away by drain-pipes. Nevertheless they did not find that any of the tanks leaked.

Mr. Corbet Woodall said the principle involved in the construction of this tank was the replacement of cement by asphalt. Asphalt was rather a broad term; and he should like to know what was the particular kind of asphalt used. The section reminded him very much of those they had seen designed a long time ago by Mr. King's distinguished father, where he thought the same course was followed, of putting a lining of brickwork against the rock, putting a further ring of brickwork within it, and filling in the space with cement. It occured to him that in estimating the comparative cost of the tank as described, and a tank built in cement and rendered, the inner ring would hardly be necessary in the latter case. If the first ring against the rock had been built to the proper sweep, and then rendered inside with cement, one could not see any good purpose served by the inner ring of brickwork. Taking the value of the inner ring, and the value of the asphalt, he thought that a brick tank rendered in cement would prove to be cheaper, and that it would be thoroughly efficient. One other point he could not but express his own dissent from; and that was the use of one pipe for the purpose of conveying the gas in and taking it out of the holder. No doubt Mr. King did not suffer any inconvenience in his works from sending the gas into the district as it was made. There was probably an almost absolute uniformity in the quality of the gas made; but he held that with a large and costly machine like a gasholder, it was a risky thing to let its usefulness depend on one pipe only. He should like to ask whether or not the rock could be so accurately dressed in the process of excavation as to make the first ring an absolute cylinder, without needing to be packed in behind; and whether the brickwork was placed home against the rock, and had on its inner surface an absolutely cylindrical form. He was building a tank in chalk; and, knowing it was impossible to dress the surface of the chalk so accurately that the brickwork could go dead home against it, he deliberately arranged to keep the brickwork 3 inches from the face, and fill in with fine concrete between the back of that and the chalk, and then render the face of the bricks. He had no doubt this would result in a perfectly sound and good tank.

Mr. C. E. Botley (Wormwood Scrubs) said that he had used asphalt considerably in the construction of gasholder tanks; and as the President had invited remarks respecting the construction of abnormal tanks he might give the particulars of a tank lately constructed on the shores of a bay.

The situation was rather awkward, as it was in an intervening space between a railway embankment made of ashes, and the cliffs; the ashes being porous. The tide receded and left the rocks dry each day; but when it rose it came to within 2 feet of the top of the embankment which formed the level of the gasholder tank, because it was proposed to utilize the intervening space by filling it up and building gas works on it afterwards. The rock was first blasted level, and afterwards a row of brickwork put upon it in cement, and carried up, without any coffer dam, at favorable times when the tide receded. As it was carried up, they allowed the water to make its way into the interior; but finally, when completed, they put puddle all round the outside, with a backing of ashes about 8 feet thick at the tank level, and tipped from the top, so as to form an angle which would not slip. The tank when tried was not quite tight, owing to the water making its way under the tank wall; but they succeeded in making it perfectly so by the use of asphalt. The bottom being quite level, it was an easy matter to prepare it, and to put a smooth coating all over; and since that time, although the tide rose and fell every day, surrounding the tank, they had found it perfectly tight. It was only a small tank, about 30 feet in diameter.

Mr. R. Mitchell (Edinburgh) said he knew of a tank which was constructed in a very similar way to that described by Mr. King; and if he was not mistaken, it was designed by Mr. King's father. The only distinction was that at every 2 feet there was a longitudinal slot, and than a vertical one. Asphalt was used, on account of the close proximity of the tank to a brewer's well; there being about 12 wells within a short distance. The only difference was that the tank was rendered with fine cement instead of asphalt.

Mr. W. Parlby (Hereford) asked Mr. King whether the asphalt used by him was manufactured on the works or came from the mines.

Mr. W. Carr (Halifax) said that a short time ago he was at Leeds, speaking to Mr. Bartholomew, the Chief Engineer of the Aire and Calder Navigation, about the construction of tanks; and he suggested something which seemed to be very applicable to a tank such as Mr. King had described. They were now using vitrified bricks, laid with Portland cement, without any rendering or puddle backing. He found them quite sufficient for his purpose; and believed they were perfectly water-tight, and much more durable than ordinary brickwork. In a tank he had just constructed he had but one pipe both for the inlet and outlet, and he never could see why two pipes were necessary for a holder when they were put into the same dry well. They had a large holder at some distance from the works; and he found that, if they were careless in changing the purifier, a small quantity of air found its way in, and affected the illuminating power at the outlet of this holder within about 20 minutes or so, although there were two pipes to the holder, and although it might be full of gas at the time. This showed that the objects usually supposed to be attained by having two pipes, of getting the gas pretty well mixed inside, was not accomplished unless the pipes were a long way apart in the interior of the holder. He did not see that two pipes overcame the difficulty which Mr. Woodall foreshadowed—namely, that the usefulness of the holder was dependent on one pipe—because where there were two pipes, if usefulness was dependent on the two being free, and one stopped, it was just as bad as if there was only one pipe. It was generally the inlet-pipe that stopped, if there was any stoppage. Of course he did not allude to their being flooded with water, to which both pipes might be equally liable. He certainly thought one pipe was all that was necessary, unless the object was to mix the gas well within the holder; in which case the pipes ought not to be put near together inside. He did not know that there was anything in his experience with regard to tank construction that was sufficiently novel to bring forward, so as to make it of interest to the members. His last tank was on a hillside, where the difference of level was about 40 feet; so that he had to make the ground on one side, and excavate on the other, in order to get an even surface. The ground was entirely excavated from the millstone grit; and this rock was so exceedingly hard that it was impossible to dress it in the shape of the tank. It was taken out in large blocks according to the natural partings, or blown out with gunpowder. Consequently, they had to fall back on the usual method of construction.

Mr. A. Thomas (West Cowes) said at his works a tank was constructed a short time ago, and the contractors put in only one pipe. The result was that when they began to charge the retorts, the first portion of the gas given off was of inferior quality; and when this reached the burners the consumers complained about it so much that at last they had to cease charging altogether from the time consumption commenced until after ten o'clock at night. Consequently they had to stop the works for two or three days, lift out the gasholder, and put in an additional pipe, let it down inside the tank well, cut through the brick, and puddle it round without taking the water out. Speaking of asphalt for the bottoms of tanks, he remembered 21 years ago a gasholder being put up at Burton-Trent, and asphalt being laid at the bottom of the tank; there being a good deal of water to contend with. But in that case they put in wrought-iron pipes, with flanges riveted round them; and in pulling up the flanges, in making the joints, it was found there was an unequal strain on them. When the water was pumped from the tank it came in again as fast as it was taken out. They then came to the conclusion that the flanges were defective, and they had to make them up with red lead. He thought it was a risky thing to have a tank with only one inlet-pipe. Some two or three years ago one of their pipes stopped; but, fortunately, there was a second pipe in, and but for this the consumers could not have been supplied. It was stopped for some few months; but they managed to work through a small holder into the large one, and out of this holder into the main.

Mr. H. Woodall (Leeds) said he should be sorry in these days to depend upon a single pipe, because an extra pipe would not cost more than £100, or about 1 per cent. on the cost of the holder; and his experience was decidedly in favor of two pipes. On one occasion, on the completion of a tank, they were taking out the suction-pipe, when it fell on to the pipes below, and one of them was broken; and they had to go on with the one pipe which was uninjured. Supposing they had only had one pipe, what a delay there would have been. With regard to the difference in the quality of the gas manifesting itself at the outlet, even if there were two pipes, this would not be so if the pipes were properly arranged, one on either side of the tank; because the inlet gas could not make its way to the outlet, supposing the holder were full in so short a time. If they were short of gas, the consequences would be very serious indeed if they had a varying quality of gas made, and delivered directly to the consumers.

Mr. G. Livesey thought the paper, embracing as it did a distinct novelty in gasholder tanks, showed the great advantage of the Institute. Previous to the meetings of the Gas Institute, each engineer was in the habit of following the precedents and practices of his own neighborhood. Speaking more particularly of London, the tanks generally followed one uniform system. When not of iron, brick puddled tanks were universal; the only difference being that some were constructed in a stratum of gravel, while others were in clay. But the information derived at various times at the meetings of the Institute had shown that tanks varied almost as much as the circumstances in which they required to be placed; and here was a further illustration of it. He was pleased with the paper on this very ground; although he was not quite certain whether the tank could not have been constructed more cheaply if the plan suggested by Mr. Woodall had been followed, of having a lining of 9-inch brickwork only, rendered with Portland cement. There was, however, this objection to the rendering, that it was the surface which was most likely to be injured by the construction of the gasholder; whereas Mr. King had absolutely protected from any injury whatever his arrangement for making the tank water-tight. This was a very valuable feature. In a tank with which he (Mr. Livesey) was concerned in the country, which was being built in a stratum of rock, the rock was to be excavated as nearly vertical as possible; but, as it contained a great many fissures, they were lining it with concrete. The original idea was to build a cylinder of 9-inch brickwork, about a foot distant from the face, fill in the space with concrete, and render the face of the brickwork; but, on going into the matter, it was ascertained that brickwork would be found more expensive than concrete. So they had given up the brickwork altogether, and were now simply lining the rock with concrete, which would be rendered. But then the contractor for the tank came forward, and said that, as he was to be held responsible for its being sound, possibly when the gasholder was being put in, some injury would very likely be done to the lining, which he would have to repair, although this injury would, in all probability, result from the carelessness of the men who were putting up the gasholder. He (Mr. Livesey) said he did not think there was much danger of injury to the sides, but to the bottom there probably was, because the fall of a heavy bar or hammer to the bottom might injure the surface. So, in order to protect it from such injury, they were going to cover it with one course of blue bricks, laid flat in cement, so that the flat bottom would be very much like that designed by Mr. King. He believed this tank would be cheaper than if it had been constructed in the way proposed by Mr. King. Possibly, in his case, his might be the cheaper and better way; at any rate, he deserved great credit for having brought forward an entirely new system. As to the use of one pipe, he could not say that he agreed with Mr. King. If they were obliged to have a dry well, the well was the more expensive thing; and putting in a couple of pipes was a matter of very little moment. But with pipes of this large size it was not necessary to have a dry well. In the South, where they were subject to deposits of naphthalin, he would not put in a pipe with internal flanges, because it would be more difficult to clean. He had had a case where there were in a tank two pipes, both of cast iron, 2 feet in diameter. One of them cracked right across, about 25 feet below the water line, through some defect in the casting, and the water rushed in, thus rendering the pipe completely useless. If they had not had two pipes, the gasholder would have been entirely thrown out of use also. As soon as they were able to dispense with the gasholder, they sent down a diver, who put on a clip, packed with india-rubber, outside the pipe; then a man went down inside, drilled the necessary holes, and screwed on a plate. If the dry well was not used, there

was no reason for putting two pipes in the same place; and he did not believe that having two pipes close together would be effectual in mixing the gas. Some years ago he had a complaint of gas being very poor. It occasionally happened that a purifier was changed and set to work just about lighting-up time, without blowing the air out; because in those days they were not so particular about this. The air from the fresh purifier not only passed straight through the gasholder, up the inlet and down the outlet pipe, but could be traced for a mile or two away into the district. To avoid this possibility, because it might happen now that a purifier would be put on without blowing the air out (and being so much larger, it was much more important to avoid the risk), in the tanks designed for their new works at East Greenwich, they put the inlet-pipe in one part of the tank, and the outlet in another. There being no dry well, there was no reason for having the two pipes close together; and by this means they secured the absolute mixing of the gas.

Mr. J. P. Leather (Burnley) said at their works they had only one pipe for both inlet and outlet. Originally this was brought about by the smallness of the works; but on their increasing the size of the works, they connected the inlet and outlet together, and used them at the same time. Now they had only one pipe to new holders as well. They connected the holders in operation by means of a four-way valve; never having the gas going into and out of the holders at the same time, because it would be impossible with a single pipe. They never had the gas going direct from the works into the town. It was always going into one holder and out from a different holder; and they did not find any inconvenience whatever. He did not think they blew the air out of the purifiers; indeed, they knew (having a jet photometer always connected) that when a purifier was changed the illuminating power of the gas went down to 14 candles, or even lower, though it was usually up to 17 or 18 candles.

Mr. W. W. Hutchinson (Barnsley) asked what was Mr. King's opinion of the probable behavior of the inside lining of asphalt as compared with cement. He believed that with asphalt there was a certain amount of friability which might prove dangerous.

Mr. J. B. Ball (Rochdale) inquired if Mr. King could tell the meeting why the necessity arose for the inner ring of brickwork. Seeing the rock could be cut down so nicely as shown on the section, he should have thought the asphalt could have been put in behind one course of bricks instead of putting in an inner ring of brickwork, and filling the asphalt in between.

Mr. King, in reply, said, with regard to the use of cement lining, and the rendering of the surface of the rock with cement, as suggested by Mr. Foulis, it was a sandstone rock which varied very considerably in hardness in a tank of this size, 200 feet diameter; and from the experience of the past, which was confirmed when the work came to be carried out, it was believed there would be various classes of rock met with. Some veins were hard, and some exceedingly soft; and there were so many fissures that it would have imperilled any attempt to render with cement the mere surface of the rock, however carefully it had been excavated. If the surface had been rendered with cement at once, there would have been almost a certainty of the rock shelling off in places, and carrying the cement lining with it; so that it would have been altogether unsafe, under these circumstances, to have adopted such a system of construction. The brickwork was built close against the rock as far as possible; but, in carrying out a work of this magnitude, there were, of necessity, hollow places left, owing to the carelessness of the workmen or the fissures of the rock. These were filled in with a sort of rough concrete. Supposing he had merely the inner surface—or perhaps it ought to be called the outer skin of brickwork—built alone, and the asphalt poured in at the back, the quantity of asphalt would have been so large that it would have added very greatly to the cost of construction; and it would then have been a question whether each layer of asphalt could have been kept so clean as a lining between the two rings of brickwork. On these grounds he preferred to build the tank as shown in the drawing. With regard to the cost of the work, the contract (which was in one sum) included a large amount for the excavation and clearing of the land, so that it was not solely for the construction of the tank. In all these cases of construction it should be borne in mind that there were probably not two cases similarly circumstanced in the Kingdom. In one town the contractor might have a place where the soil could be deposited on the gas works; while in others it might have to be carted a long distance. So that in speaking of the cost of a tank, or of any work where the excavated material had to be carted long distances, this was an element of expense which should not be fairly charged against the work; and the price could not be compared with work in another place where a large portion of the expense of cartage might be saved. Comparing the cost of the tank with brick tanks, his opinion was that it had been done for less money. With regard to the tank being tight, he had explained in the paper that the leakage was hardly a measurable quantity. At the present time the tank was empty, to admit of the erection of the second lift of the holder; but he had no doubt when filled again it would be perfectly tight. From the commencement he naturally watched the process of filling with a good deal of interest, as it was the first tank of the kind; and the result fully justified the system of construction. With regard to the question of one inlet-pipe or two, there seemed to be considerable differences of opinion. In thinking over the question of this tank, he had not been quite able to convince himself that two pipes were necessary. He thought it was rather like making a large hole for the cat and a small hole for the kitten; and that where there were two gasholders or more, one pipe should answer every purpose. In those works where only one holder existed, it would be desirable to have an inlet as well as an outlet pipe; but then they should be placed very far apart. In the older gasholders it would be found that if any impure gas, or admixture of gas and air, found its way into the holder, it was apt to go up one pipe and down the other immediately without mixing; but this might be obviated by separating the pipes. Where many gasholders were in use, he had come to the conclusion that it was not at all necessary to have two pipes. With regard to what had been called "dry wells" (which were, however, generally very wet), the practice was—at all events he had made it so in tanks he had constructed—to have the inlet and outlet pipes of such a size that any one could easily get down them for repairs. In that case the pump-pipes were carried down inside the gas-pipe. They protected them from injury, and it answered every purpose. Even with faced joints, if carefully put together, especially in such ground as this (where there was no chance of settlement, and no colliery works existed underneath), he had never had any trouble. With regard to the inner skin of brickwork, this was built to admit of the formation of the asphalt joint, and to protect the asphalt from injury. Of course such a construction could not have been carried out at all without the inner skin being built. He was also asked whether cement could not have been used instead of asphalt. Some twenty years ago, in the same neighborhood, a tank 120 feet in diameter was erected by his late father, and cement was used in it. Since then cement had doubtless greatly improved, and work of the kind could be much better done now than it used to be. Still, in that case, the result was not perfectly satisfactory, and the tank gave a great deal of trouble at first; and, in view of this being erected in the same formation, within a quarter of a mile of the other tank, and of increased size and depth (200 feet by 40 feet), he felt hardly inclined to use cement, but thought it better to employ a material which he believed would give a perfectly satisfactory result. The asphalt he had employed was manufactured by a firm in Liverpool, who made immense quantities of the article, especially for use by the Mersey Docks and Harbor Board; and in some of their works as much as 40 feet vertical had been constructed of this very material. He therefore had considerable confidence in its use, feeling that it was an article which had been thoroughly tested; and the result had justified its use. He hoped he had explained satisfactorily the special reasons why the tank had not been constructed as some gentlemen had suggested. He had listened with much interest to the discussion which had taken place, and thought it justified his bringing forward the subject; because, as Mr. Livesey had said, it was at their meetings (and especially in the discussions on these technical points) that information was elicited which proved valuable when they were individually called upon to construct large pieces of apparatus. Knowing what their neighbors had done, they could either follow their example or avoid their errors. But, at all events, truth in this matter was none the worse for being thoroughly threshed out at meetings of a technical character.

The President said the paper had, as he had anticipated, led to a very interesting and instructive discussion. It was not always the length of a paper which indicated its value; for very frequently more benefit was derived from the discussion than from the paper itself. The paper described, in a very lucid and interesting manner, the construction of a tank of a particular formation. The discussion had led to the description of tanks of other construction; and it had conveyed a good deal of information to members, showing the practice which was going on in different parts of the country. He quite agreed with what had been said as to the value of the Institute in disseminating knowledge of this kind. If members, whenever they had any construction which was at all out of the ordinary way, took notes of it, and furnished themselves with all details, so that they might be able at the next meeting of the Institute to bring forward their experience, it would, if it had proved successful, lead to its being copied by others. If not, it would show how to avoid failures. Either way, much good would be done.

The English Electric Lighting Act.

The *Pall Mall Gazette* reports Mr. Arnold White, late of the English Edison Company, when interviewed on the subject of the provisions of the English electric lighting act, as saying—

"The failure of the act arises primarily from comparing the gas burner, which consumes something physical—namely, gas—with the incandescent lamp, which gives something infinitely more subtle—namely, a form of energy. The cardinal principle running through the act, and which vitiates

it, in my opinion, is the treatment of electricity as though it were treacle or butter—as though it were ponderable, and could be sold in quantity; while it is obvious that electricity is only known by its effects in heat, light, or power."

Mr. White, in attempting an explanation of where all the millions of money spent in electric lighting schemes abroad went to, says—

"In 1882 there were sixty-two companies founded, the paid-up capital on which was £4,951,575. Since then about £400,000 has been called up, giving a total of £5,351,575 as the amount actually invested since 1882 in the electric lighting enterprise under the joint stock companies act. I estimate the expenditure of this amount during the past thirty months to have been as follows:

Promoters, including "patents"	£800,000
Inventors	115,000
Law and Parliamentary charges	160,000
Directors' fees	130,000
Expended on exhibitions and free lighting, undertaken for advertisement	300,000
Expended on machinery and plant, now mostly obsolete	270,000
Expended on installations and ship lighting, undertaken mainly at a loss	1,000,000
Fixed charges—*i.e.*, clerks, secretaries, office rent, advertising, and sundries	1,250,000
Cash in hand	500,000
Factories, plant, and stock	826,575
Total	£5,331,575

"I do not believe that as a going concern the electric light interests now in the hands of the joint stock companies are worth in the aggregate more than a million sterling, and I question whether the profits on the business as a whole would yield 5 per cent. dividend on that amount. In support of this opinion I may mention that the paid-up capital of those electrical companies which have obtained a quotation on the London Stock Exchange amounts to £1,289,000, while, at the price quoted in a recent official list, the whole could now be bought for £221,880."

SPECIAL ENGLISH CORRESPONDENCE.

Communicated by NORTON H. HUMPHRYS.

SALISBURY, August 9th.

It is not often that gas appliances come before our Justices in the law courts. Some few years since gas engines had a tolerable long innings, on the occasion of a trial relating to certain patent rights respecting machines on that principle; and lately a case between rival street lamp makers has occupied the attention of Justice North, in the High Court of Justice, for 15 days. Justice North did not find the investigation of the details of structure and scientific principles involved in the manufacture of the modern large gas lamps—which has so effectually illustrated the superiority of gas, for supplying intense centers of light, over any system of electric lighting yet introduced—a specially pleasing occupation; at least we may judge as much from the fact that when in the course of the evidence it was shown that the plaintiff and defendant had carried on a "newspaper war," until the editors got tired and closed their columns against further "letters" on the subject, the "bench" expressed a wish, in parenthesis, that "he had as much power as the editor of a newspaper." Though naturally possessing no special interest to a gentleman holding a high position in legal circles, the evidence in the case of "Sugg *vs.* Bray" is of a character that renders a report of the case a valuable addition to the library of a gas engineer, or to that of any person interested in the scientific department of the gas industry. No less then four of the most eminent lawyers of the day were employed by the plaintiffs; while a similar number, of equal position, were retained for the defence. And the experts examined as witnesses included, besides Mr. W. Sugg and Mr. G. Bray, the well-known names of Sir F. Bramwell, Dr. J. Hopkinson, Mr. J. R. Wigham, Mr. G. Livesey, and Mr. Corbet Woodall for the plaintiffs; and Mr. J. Imray, Dr. W. Wallace, Dr. Stephenson Macadam, and Mr. H. Woodall for the defendants. The primary object of the action was to restrain the defendant Bray from injuring the plaintiff Sugg in his character, property, and business, by issuing threatening notices in the form of circulars addressed to Mr. Sugg's customers, and by defamatory or injurious statements made by circular, verbally, or by advertisement in newspapers. An injunction for this purpose was requested, and 40s. nominal damages were claimed. After hearing the evidence, and addresses from counsel, etc., Justice North announced that he would take time to consider his judgment.

The report of the directors of the Gas Light and Coke Company has been published, in anticipation of the half-yearly meeting of shareholders, which was held yesterday. As this company supplies the greater part of London, the magnitude of its operations naturally attracts special attention to it. The actual profits during the half year, ended June 30th last, amount to £491,711, out of which it is proposed to pay a dividend of 12 per cent. Since the Parliamentary obligations of this company include the arrangement known as the "sliding scale," the shareholders would not be entitled to receive so high a rate of dividend but for the fact that the price charged to the consumers is not more than 3s. 1d. per 1,000 cubic feet—the present price for gas being three shillings per 1,000 cubic feet. The report commences with a few encouraging and hopeful remarks respecting the plant for utilizing their tar, the management of which has not been altogether a success in the past. The directors evidently believe in keeping well ahead as regards coal contracts, since they state that "a temporary depression in the coal trade has afforded a favorable opportunity of extending their contracts to midsummer, 1886, as well as for almost the whole of the supply for the year following." From this rather ambiguous sentence it appears that their present contracts extend nearly to the end of 1887, or something more than three years in advance. An allusion is made to the "steam roller case," particulars of which I have given in my letter, published on July 2d. The last paragraph refers to "certain contemplated reforms in the internal administration of the company." These reforms consist of the appointment of Mr. Trewby, hitherto superintendent of the Beckton station, to the imposing office of "constructing and carbonizing engineer in chief;" while Mr. F. Harris, formerly superintendent of the Bow station, is elected to the more modest office of "distributing engineer." By thus centralizing the engineering and the out-door departments, respectively, the services of three resident engineers and the chief inspector have been dispensed with; and these four gentlemen, the shareholders are informed, "have evinced their satisfaction and their grateful acceptance of the terms of retirement which have been offered to them." The expression "grateful" rather "grates" on one's feelings; for these gentlemen, I believe, are all old and tried servants who have devoted the best part of their lives to the promotion of the interests of the company, and, indeed, have in their respective capacities assisted in no small measure in securing the present prosperous state of affairs. A liberal retiring allowance is nothing more than mere justice, under these circumstances; so it ought not to be publicly stated that they have "gratefully accepted" what they are justly entitled to. The expression might mean that they have been liberally dealt with; but it might also be interpreted as meaning that they were glad to get out at any price. The retirement of "the three resident engineers and the chief inspector" might have been alluded to in terms more courteous, more complimentary to their positions, and expressive of greater consideration for their private personal feelings, than those above quoted.

One of the popular periodicals of the day, the *Pall Mall Gazette*, has of late taken some notice of the subject of artificial light. Following the example of the American interviewer, a representative of that paper has waited upon certain prominent commercial men, and from the information thus received has constructed well written articles, which, however, sometimes degenerate almost to mere trade announcements, such as might come appropriately in a circular issued by the person interviewed, but scarcely form suitable matter for a magazine article. In this form Mr. Hammond has expressed his views on the present state of the "electric light," and Mr. Phillips, the secretary of the Gas Light and Coke Company, has explained to certain dissatisfied consumers how it is that their gas bills have gone up; but we are now concerned with "an interview with an ex-managing director of the Edison Company," which appeared in last week's issue of this periodical. From this interview we gather that the total amount *actually invested*, during and since the year 1882, in electric lighting companies under the Joint Stock Companies Act, is about £5,250,000 ($26,750,000), and, at the prices quoted in current official lists, the whole of this could be purchased for £221,880, or something less than 5 per cent. of its cost. Under these circumstances it is suggested that the only chance of saving the electric light companies from actual ruin is "a general fusion of interests under a common management." But the obvious purpose of the article is to blame the Parliamentary provisions of the "Electric Lighting Act, 1882," for this disastrous state of things; and which appeared mainly instrumental in causing Mr. Arnold White, the ex-managing director in question, to "become disgusted, and retire into the ranks," although "he is as warm an advocate of the electric light, from the commercial, social, and sanitary points of view, as ever." The principal cause of Mr. White's disgust appears to be that the electric light companies were not allowed to pick and choose their customers, and to put it shortly, that obligations of any sort were imposed upon them. He complains that electricity has been treated as though it were treacle or butter; that a number of restrictions and penalties were imposed from the fear of a great monopoly arising; and that no powers were given for the compulsory acquirement of sites on which to generate the electricity. But the experiences at New York, quoted by Mr. White, fully explain the cause of the failure of the electric light, in England at any rate; we are informed that "in New York, where the largest electric lighting station in the

world has been in operation for about two years, and where the current is sold at an equivalent of about seven shillings and six pence ($1.80) per 1,000 cubic feet of gas;" it is found that, unless the company were allowed to pick their customers, they would not be enabled to carry on successfully. If the electricians cannot, except under specially favorable circumstances, earn a profit out of rates equivalent to 7s. 6d. per 1,000 cubic feet of gas, there is no occasion to look up the Electric Lighting Act to account for the commercial failure of the electric light in England, where gas is sold at less than half that figure, as a general rule, and often for one-third, and even one-fourth.

The gas examiner for the city of Manchester reports that the quality of the gas supplied during the nine months ended June 30th has ranged from 18 to 21 candles, and averaged 19.5. It has been free from sulphuretted hydrogen, and practically so from ammonia, the quantity of this substance rarely exceeding 0.2 grain per 100 cubic feet. As regards carbonic acid, and sulphur other than sulphuretted hydrogen, the report is not so satisfactory. The average quantity of carbonic acid present has been 2.9 per cent. by volume, whilst the sulphur has ranged about 36.5 grains 100 per cubic feet. From this it will be evident to the initiated that the gas works at Manchester belong to the corporation. When they belong to private companies, obligations are usually enforced to keep the residual sulphur at less than 20 grains. Although a great deal of fuss has been made from time to time about the sulphur compounds, it is the general rule for this question to drop out of sight in those towns where the gas plant belongs to the corporation or other local authority. It is interesting and instructive to compare this sample of corporation gas with the gas supplied to the city of London by the Gas Light and Coke Company, the South Metropolitan Gas Company, and the Commercial Gas Company, as shown by the official returns for last month. In each case the illuminating power is about one candle above the fixed standard of 16 candles for common, and 20 candles for cannel gas; and the sulphur ranges from a minimum of 5.7 to a maximum of 14.7 grains per 100 cubic feet, in most cases being below 10 grains. The present obligations of the London Gas Companies are—sulphur not to exceed 17 grains, and ammonia not to exceed 4 grains per 100 cubic feet. Pressure, between sunset and midnight, to be not less than one inch, and between midnight and sunset six-tenths of an inch.

Some researches in which I have lately been engaged show the importance of removing carbonic acid and all other incombustible matters from illuminating gas. In the Manchester gas just mentioned the quantity of carbonic acid present was 2.9 per cent. by volume, which is not less than three times that quantity, or nearly 9 per cent., by weight. My experiments show that the effect of such a quantity of carbonic acid would be to diminish the illuminating power, to the extent of certainly not less than 4 candles; so the gas, though returned as 19½ candle quality, was really *diluted* 23 *candle gas.* I think there are few localities where cannel or other enriching material is so cheap as to render it commercially advisable to leave carbonic acid or other incombustible matter in the gas. Anyone having a photometer can readily experiment on this matter. On the pipe supplying the burner insert two branches with a cock between them. The two branches—each of which must be fitted with a cock—are connected to a small lime box, of not less than one cubic foot capacity. As an additional precaution to secure the removal of all the carbonic acid, the lime used in this little box may be slacked with a strong solution of soda, instead of ordinary water. Where the gas contains two or three per cent. of carbonic acid, a few observations of the illuminating power (a) direct from the supply, and (b) after passing through the lime box, will prove an eye-opener to many gas engineers.

The Petroleum Situation.

Stowell's *Petroleum Reporter,* in its issue dated August 22d, remarks as follows upon the prevailing situation:

"The course of last month in the petroleum market was marked by no serious fluctuations in price. Opening at 60 cents, there were during the month slight fluctuations as high as 66¾, the price, however, falling back after each to its original level until the 29th of July, when, under the influence of a serious decline in the production of the Wardwell tract, the price jumped to 72¾ cents, and on the next day, July 31, to 75. This jump into the seventies was maintained, and on August 8th another advance took place, the figures reaching the altitude of 80¾ cents. Fluctuations a little above and a little below 80 cents have marked the course of the trade up to the date of the present writing, and it seems quite probable that, in accordance with the hope expressed in our last issue, prices have made an advance which has placed them somewhat nearer the legitimate basis, and which will be permanent.

"During the month of July the work in the Allegheny and Bradford fields was reduced to a minimum; in fact, the operations in these two fields last month did not even equal the work under way in the lower field; a circumstance which has never before been the case since the discovery of the Bradford field. The Wardwell district has been the center of the operations of the month, and the point of interest to the oil trade. An extremely uncertain quantity has it more recently been, too; reported as increasing its production rapidly one day, and decreasing as swiftly the next, it has kept the brokers in serious uncertainty. The work going on has been over one-fourth of the total operations in the whole oil country, and the production during the latter part of July and the beginning of August ranged at about 10,000 barrels, an output of no mean importance. The wells, too, are extremely variable, some maintaining a very large production, while others close by fail rapidly, and others producing a very small quantity at the start, come in heavy after being shot. It is extremely difficult, owing to this variability, to make any predictions as to the course of this field, but at present it appears capable of holding up production to a very considerable extent.

"The general statement shows but a slight change in the statistical situation. Were it not for the energetic pushing of new operations in the Wardwell district, there would no doubt be a much greater decrease, as the very quiet state of affairs in the upper country, for which the efforts of the United Producers are responsible, no doubt has had an important effect upon production.

"In a general survey, the situation appears very favorable to those who desire higher and more remunerative prices. Production is certainly being brought down to a minimum, except in the case of the Wardwell field, and this, it seems likely, is not of a very staying character. In view of these facts, there seems much hope in the situation, and every assurance that the present better prices will continue."

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Gas War at Chattanooga, Tenn.—In the last issue of the Journal we promised to give with this number of the paper some account of what was going on in gas circles at Chattanooga, Tenn., and we herewith redeem our promise. It was hardly to be supposed that, as the "philanthropists" were operating rather extensively in the southern section of the country, Chattanooga would escape from an invasion; and Chattanooga did not escape. The particular cognomen assumed by this particular set of capitalists is the Citizens Mutual Gas Light Company, and under the usual plans, now so familiar to every gas man in the country, they obtained a charter and the right to build and operate a gas works in Chattanooga. Before they set about the operation of construction certain propositions were submitted to Mr. Caldwell, President of the old Chattanooga Gas Light Company, and had these propositions been favorably entertained Mr. Caldwell's company would have secured immunity from the hands of this particular set of raiders. Leaving out of consideration any remarks as to the honesty of the course pursued by the old company (every gas man knows that the only really honest method of procedure is to fight these strikers from start to finish), the officers of the old corporation knew perfectly well that, even did they buy the strikers out, the buying-out course only placed them in a weaker position to ward off the next attack—which was sure to come, be it sooner or later. The opposition gentry are keen of scent, and (like some feathered bipeds well known to the student of ornithology) can unerringly guide themselves to places where financial weakness leads them to believe there is a likelihood of collapse. Having constructed an apology for a gas plant, the Citizens Mutual thought the time for aggressive action had arrived, and things at Chattanooga began to "hum." On the 1st of last month the old company issued a circular to all its consumers, stating that a reduction of 10 per cent. would be made from the regular price of $2.50 per 1,000 cubic feet, and followed that up by publishing a table of discounts which would also apply to consumption dating from the 1st of August. This table allowed a discount of 20 per cent. on bills of $20 and under; 25 per cent. on bills between $20 and $30; 30 per cent. on bills between $30 and $50; 35 per cent. on bills between $50 and $75; and 40 per cent. on bills of over $75. In order to cope with this schedule the new company came out with a card containing the information that all gas supplied through its meters should be charged for at a uniform price of $1.50 per thousand. Mr. Caldwell was ready for this phase of the matter, and on August 3d his company came down to a selling price of $1 per thousand. Naturally enough, the consumers who pay the gas bills are overjoyed at the contest; but the editor of the Chattanooga *Weekly Commercial* is a trifle uneasy over the battle, since he says:

"Gas at $1 per thousand is cheap enough; still, it is doubtful if anyone will grumble should it go below that figure. Yet all things must have a limit; and we would advise the companies, in view of the fact that at reasonable rates there is patronage enough to sustain both, to fix a just rate and stick to it. Throat cutting will, in a way, hurt both companies, and finally the citizens."

While this editor may not use the most choice expressions at command in designating the contest as a game at "throat cutting," he still manages to call the case by a name which is appropriate, inasmuch as, when the final scene is reached, the "citizens" will have the pleasure of paying for the "blood that was spilled," and have but themselves to blame for allowing the whole thing to come to pass. As soon as the old company promulgated the dollar rate, a similar announcement was made by the opposition, and "dollar gas" prevails at Chattanooga. During an interview between President Caldwell and a *Daily Times* reporter, the former gentleman said: "The dollar rate was made by us on account of the fact that the new company had been making secret contracts below its published prices. My brother officials and myself were tired of slowly inching along, and now propose to go into this fight without any further skirmishing. I cannot say how long the dollar gas will be sold, and it is even probable that the future will see still lower prices. I believe the public are disposed to patronize a home company that supplies a safer illuminant than does the concern which is controlled by the Standard Oil Company. Of course, both companies will lose money at present rates. The new company cannot make gas as cheaply as we do; consequently they cannot afford to sell it cheaper. We built a works here when it was a losing investment, and have kept pace with the town in its progress, steadily increasing our plant and enlarging our facilities, in order that we could meet the demands made upon us. It has, as you know, been our rule to reduce rates as the consumption increased; and our reduction made on August 1st was simply in accordance with our former policy, and without any reference to the new company. We are now ready and anxious to fight this thing out to the end."

As the time for making the annual contract with the municipal authorities was close at hand, much interest was manifested as to who would secure the award. On the night of August 5th the City Council chamber was crowded with people eager to learn the disposition of the matter, and curious to know what prices would be submitted by the competitors. When the bids were opened the following condition of affairs was disclosed. Mr. J. A. Caldwell, on behalf of the Chattanooga Gas Light Company, handed to Mr. Chas. H. Dyer, Chairman of Committee on Fire, Water, and Lights, his bid, which was as follows:

"Complying with your request, the Chattanooga Gas Light Company will furnish gas for twelve months to the public halls, etc., of the city at the rate of 74 cents per thousand cubic feet, and for the street lamps, through the usual size 5-feet governor burners (lamps to be lighted and extinguished as specified in former contract), at the following rates:

For more than 150 lamps per month, each	$1.10
For 120 to 150 lamps per month, each	1.15
For 100 to 120 " " "	1.20
For 75 to 100 " " "	1.75
For 40 to 75 " " "	2.05
For less than 40 " " "	2.50

"Should you accept the foregoing offer, a committee from this company will meet a committee from your Board to execute the contract."

Mr. M. Block, representing the Citizens Mutual Gas Light Company, then presented his figures:

"In compliance with your request to make a bid for furnishing gas to the city for public buildings and street lamps, I have the honor to submit the following propositions:

"We will furnish gas for all street lamps located now, or which may hereafter be erected on such streets where our mains are laid, for the sum of $1.20 per month for each lamp (bills to be payable monthly), for the period of twelve months from the date of contract, and will furnish light to the public buildings situated along our mains at the rate of $1.00 per 1,000 cubic feet."

It must seem rather odd to the people of Chattanooga, when remembering all the talk indulged in by the leaders of the opposition movement as to how cheap they could manufacture their superior water gas product, how it is that the old coal gas company could, when the crucial moment came, beat them so easily in the matter of prices on public lighting. At any rate, the respective offers were made as recorded above, and we are told that "seeing is believing." The bid of the Chattanooga company's officials was accepted, and they will still continue to light the streets of the city. President Caldwell has plenty of "grit," and the course pursued by him is the one most likely to lead him out of danger.

To be again Represented at the Toronto Exhibition.—The majority of our readers will remember the splendid results that followed the energetic efforts of Mr. W. H. Pearson, Secretary of the Consumers' Gas Company, of Toronto, Ontario, in gathering together a complete exhibit of gas appliances at the Toronto Industrial Exhibition, held in September, 1883.* Mr. Pearson intends to repeat the former trial, and writes us to say that any of the fraternity who may happen to be in Canada between the tenth and twentieth days of this month, will not be disappointed should they see fit to attend the 1884 display of the Toronto Industrial Exhibition. Perhaps if the gas men would do so, they might be inclined to attempt something of a similar nature in their own cities upon their return home.

* See Journal. Vol. XXIX., issue of Oct. 2, 1883, pp. 171-2.

Assessing Brooklyn's Gas Companies.—The following is a list of the amounts, as they appear on the assessor's books, upon which the gas companies of the city of Brooklyn (N. Y.) will be required to pay taxes in the shape of personal property. It appears to us as though they had gotten the figures about high enough:

Name of Company.	Amount.
Brooklyn Gas Light Company	$802,800
Citizens " "	470,000
Fulton Municipal Gas Light Company	1,565,000
Metropolitan " "	315,000
Nassau " "	566,000
Peoples' " "	142,000
Williamsburgh " "	373,000
Total	4,234,200

The ways of boards of assessment are always hard to understand; but how they can figure out that the personal property of the gas corporations over in the City of Churches has made the amazing total gain of over one and three-quarter millions of dollars in a single year is a trifle more than ordinarily perplexing. The valuation in 1883 was $2,443,600.

Natural Gas for Heating Purposes at Washington, Pa.—A company has for some time back been supplying the citizens of Washington (Pa.) with natural gas for heating purposes. We have been informed that the scheme is quite a successful one, both as regards cheapness and efficiency. Could we call upon Mr. Jno. C. Hastings, Secretary of the gas company at that place, to furnish us with some figures in reference to the manner in which the gas is charged for, the pressure at which it is supplied, etc.?

Tucson, Arizona Territory, Does Away with the Electric Light.—Tucson, in far-away Arizona Territory, was progressive, and so it ordered that its streets should be illuminated by the rays (or shadows) of the arc lamp. Tucson still continues to be progressive, since, after a fair trial of the system, it has decreed that the rays (as also the shadows) shall flicker no more. On the morning of August 8th, Councilman Cronly moved that the use of the electric light, for purposes of public illumination, be discontinued on and after August 18th, when the contract with the purveyors thereof would have terminated. The resolution passed by the unanimous vote of the Board; but Mayor Strauss, elevating himself to the grandeur of the one "intelligent juryman," promptly vetoed the measure. The resolution was then passed over the Mayor's objections.

And a Queer Coincidence.—We will hardly make bold enough to say that the electric current felt the indignity put upon it by the Tucson City Council on date of August 8th; but certain it is that on the night of August 9th the establishment of L. Zeckendorf, at Tucson, A. T., was set on fire by falling sparks of carbon igniting a quantity of lawns, linens, etc., that were piled up on a counter under an arc light which was usually kept burning throughout the night. The blaze, luckily, was discovered before it had made very great headway; still, as it was, damage to the amount of $1,500 was incurred before the flames were extinguished.

The New Gas Plant at Tacoma, Washington Territory.—Some time since we announced that Tacoma was to have a gas works; and the work has been pushed along so energetically that we are now enabled to give some particulars regarding the new plant. Those who are inclined to be a little thoughtful must consider the growth of Tacoma as hardly short of wonderful. Two years ago the people of the place had to flounder around in their daily travels over ungraded, unsewered, muddy streets; and this sort of locomotion was made all the more difficult at night owing to the entire absence of artificial illumination. The year 1883 saw a few feebly glimmering, ill-smelling oil street lamps put up, and while this sort of advance did not count for much, it had one really beneficial effect in setting some of the progressive spirits of the town to thinking that the time had been reached when a gas works was a necessity; and, as a result of the thinking, Tacoma expects to have her streets lighted with gas by the middle of next October. The land purchased by the Tacoma Light and Water Company has a frontage on the water, and embraces within its boundaries about 85,000 square feet of surface. It is eligibly situated in the matter of transportation facilities, and is sure to greatly appreciate in value. The selection bears good testimony to the sagacity of those interested in the enterprise. The first of the series of buildings constructed was a capacious coal shed, 50 by 30 feet, and put up in a substantial and durable manner. Next adjoining, and to

the north, comes a neat retort house, 40 by 35 feet, and right along in sequence are the buildings for the condensing and scrubbing, purifying, and meter departments, the dimensions of each being respectively 10 by 22 feet, 22 feet square, and 10 by 22 feet. To provide for the future a vacant space of 180 feet in length remains to be called upon for utilization when necessity requires. The retort house will be fitted with four benches, but only two of these will be started up at the outset, as the consumption for the first year or two of working is estimated at only 50,000 cubic feet per diem. Should this calculation be too low, it will require but a couple of weeks' time to complete the installation of the four benches, and this will give ample facilities for a daily output of over 100,000 cubic feet. A single-lift holder, 60 by 20 feet, is in course of construction, and the station meter, calculated to pass 60,000 cubic feet in 24 hours, is almost completed. Coal will be carried right to the retort house doors in cars run over a narrow-gauge gravity road; and, in fact, everything pertaining to construction will be done in the most complete and modern style. Mr. J. L. Stamford, a young English engineer, has had charge of affairs since the ground was first broken, and he asserts that by the first day of next November, if not before, Tacoma will no longer have reason to complain of badly lighted streets.

A Gas Well Ceases to Flow.—On the morning of August 24th considerable commotion was excited by the circulation of a report that the gas well owned by the Jefferson Iron Works had "run out." Inquiry proved that the gas flow had stopped at about two o'clock on the morning of the 24th. The gas vein was struck on the 23d of last June, when the depth of boring had reached 1,215 feet. Over 600 feet of casing is down with the pipe, the diameter of bore-hole being 4 inches; and the gas flow was hitherto considered positive and certain. The Jefferson Iron Works had partially employed the gas in their working, and were engaged on alterations to their furnaces in order to make them adapted to the use of gaseous fuel. Should the stoppage prove a permanent one the company's loss will approximate to $8,000. The owners of the well express the belief that the trouble happened through the clogging of the well-tube with a sort of soft shale that abounds in the vicinity.

Decidedly Different Statements from those in Authority.—The gas men have by this time become thoroughly conversant with the value of the assertions put forward by electric lighting promotors when trying to bolster up their various pet systems of illumination, be these systems rated either as arc or incandescent. Some portions of the State of Ohio have suffered considerably from the attacks of the electric purveyors, who have been interested in installing the Edison incandescent lamp as a street lighting medium, more attention being devoted there to this field of illumination than toward the development of domestic lighting. The Edison plant has been put in operation at Circleville, Tiffin, Piqua, and Middletown in the State of Ohio, and the parties interested financially claim (of course) that the results achieved are perfectly satisfactory. In order that our readers may judge for themselves, we give below a letter written to the editor of the *Electrical Review*, dated Circleville, Ohio, August 8th, and signed by H. Ward Leonard. Mr. Leonard, we believe, is the manager and superintendent of the company owning the Edison patent rights in the locality from which he writes, and we reprint his letter simply because we would like to have the statements therein contained compared with the few lines immediately following. Mr. Leonard says:

"To the Editors *Electrical Review*:—Knowing your interest in the progress of electric lighting, I take pleasure in informing you of the entire success of a new application for the Edison incandescent lamp; I refer to street lighting. Last night (August 7th) for the first time all the streets of this town were lighted by Edison lamps, and by them only. The lighting proved satisfactory in every respect, and the experiment resulted in a grand success. Circleville is, I believe, the first town in the world to be lighted solely and entirely by incandescent lamps. There are in all some 90 lamps in the town, of which number 60 are of 32-candle power, and the remainder of 16-candle power. The town is wired in six separate and distinct circuits, all of which are controlled at the central station. The lamps are suspended over the center of the streets under a special form of reflector designed for the purpose, which also protects the lamp from rain, snow, etc. Circleville is a town of over 7,000 inhabitants, and its streets have hitherto been lighted by gas. The lighting extends for over half a mile in all directions from the central station, and in several instances for more than a mile. All the lamps are burning at their normal candle power, and the streets are brilliantly lighted. We also have a contract for lighting Middletown, Ohio, where we will replace the Brush tower system. The work is half completed there now, and the light will be turned on for the first time in a few weeks. Our central stations at Tiffin, Piqua, Middletown and here are all doing nicely, and we have all the work we can attend to."

Now, in order to understand the true value of the "normal candle power," we here reproduce some lines received from Mr. Joseph Bate, Supt. and Sec. of the Tiffin (Ohio) Gas Light Company—Tiffin being one of the places named by Mr. Leonard as "having a central station working nicely"—in which he (Mr. Bate) says: "The Edison electric light at this place has proved itself to be a system of false pretense from the start. It does not carry out, in a single instance, any one of the many promises made to furnish a cheaper or better light than that given by the coal gas sent out from the Tiffin gas works. To show the recklessness of the claims put forth, I have merely to say that an Edison lamp rated as 16-candle power actually gives a volume of light equal to but 9 candles. We sell a 20-candle power gas light at the rate of one and one-tenth cents per hour; while, on the other hand, a '32-candle power Edison lamp'—the illumination obtained being equivalent to from 17 to 18 candles only—costs three cents per hour. So much for the Edison system as operated at Tiffin, Ohio." Mr. Bate is not given to exaggerating things, but is quite content to speak of matters as he finds them existing, believing that true business policy will be best subserved by strict adherence to the truth.

Failure of a Coke Company.—The Dunbar Coke Company, works located in Fayette County, Pa., and office at Pittsburgh, recently filed a deed of voluntary assignment through its President, Mr. W. A. Shaw. The company was formed in 1880, with a capital stock of $100,000; and failure is assigned to the present depressed state of trade.

American Institute of Mining Engineers.—The fortieth meeting of the American Institute of Mining Engineers will be held in Philadelphia, Pa., commencing on date of Tuesday, September 2d, and continuing for balance of the week. The members will attend the formal opening of the International Electrical Exposition on Sept. 2d; will attend the sessions of the American Association for the Advancement of Science on the 4th and 5th, and on the 6th take an excursion to the anthracite region, at the invitation of the Philadelphia & Reading Railway. Headquarters of the Association are to be at the rooms of the Engineers' Club, No. 1523 Chestnut street.

The Ellis Lever Competition Fails of its Object.—In March, 1883, Mr. Ellis Lever, a gentleman whom we believe is largely interested in coal mining operations in Australia, offered a prize of 500 pounds sterling to be awarded to the inventor of a miner's safety-lamp answering or fulfilling the following conditions:

"The lamp to be a perfectly self-contained electric, or other, lamp, which the working miners can conveniently carry from place to place in the mine, which will continue to give a useful amount of light for not less than twelve hours, and which will not cause an explosion of gas under any circumstances at all likely to represent conditions which may occur in actual practice." Messrs. Thomas Burt, M. P., Prof. Grylls Adams, Sir Frederick Abel, and Prof. Sylvanus Thompson were the eminent gentlemen who composed the board of adjudicators; and from their report, made public in the latter part of July, we learn that no one of the lamps submitted answered the prescribed conditions. In the report it is stated that the adjudicators examined a total of 108 lamps, of which four were electric, and 104 oil lamps, of which a few were designed to burn mineral oils. With respect to the electric lamps, not one of them even approached to the required standard. The examiners state that two of the specimens submitted are deserving of mention as presenting good features of marked originality. The first of these is known as the Marsaut lamp, the second being the invention of Mr. William Morgan, of South Wales. It is to be regretted that Mr. Lever's offer failed to meet with success.

Do Your Duty.—It is to be hoped, indeed it is most certainly expected, that every member of the American Gas Light Association has paid proper heed to the circular notices issued by Secretary Humphreys in relation to the October meeting to be held in Washington. The officers of the Association have attended to their duties with promptness, and it rests with the members now to see to it that the executive heads be rewarded with a generous and hearty response from those who placed the executives at the helm. Among other good things we expect to note in connection with the 1884 meeting will be a ringing report from the special committee appointed to consider the addresses of Past-Presidents Hickenlooper and Forstall. Let every man perform his duty.

Correspondence

[The Journal is not responsible for the opinions expressed by correspondents.]

Seeking Information.

Deseronto, Ontario, August 26, 1884.

To the Editor American Gas Light Journal:

Will you kindly allow me, through the medium of the columns of your Journal, to ask what is the opinion of the best informed gas engineers concerning the causes for variation in the illuminating power of gas produced from coal when that material is carbonized at different degrees of temperature?

For instance, when coal is carbonized at low temperatures, a comparatively small amount of gas, of a certain illuminating power, is produced, together with certain quantities of tar, water, ammonia, etc. On the other hand, when coal is carbonized at higher temperatures, the resultant quantity of gas is increased, but its illuminating power is diminished, as is also the case with the quantity of condensable products obtained.

Assuming that these statements represent the actual facts observed, to

what cause must the diminution of illuminating power, noticed in the case of the product of carbonization carried on at the higher temperatures, be attributed to? Does the decomposition of the volatile carbon by heat account for it, or is it to be explained on the ground that the decomposition of the water contained in the coal accounts for the consequent dilution of the gas produced?

To put the same questions in another form: Does the total amount of illuminating power remain the same in both of the cases stated, or is there a positive loss of total illuminating power when the higher temperature is employed? Is the deposition of solid carbon on the interior of the retort made at the expense of the illuminating power of the gas, or is it made at the expense of the tar?

I notice that some gas engineers, when carbonizing coal at high temperatures, adhere to the practice of adding petroleum to the coal in order to increase the illuminating power of the gas produced. When this method is employed does the quantity of condensable products remain the same as when the coal is carbonized at lower temperatures; and what percentage of the petroleum hydrocarbons is decomposed and deposited on the interior of the retort? Also, at what temperature is the maximum yield, combined with maximum illuminating power, obtained?

If there are any data in existence bearing on these questions, and exhibiting the quantities (relative and absolute) of gas and condensable products obtained from the carbonization of coal at different temperatures, and an explanation of how these different temperatures were determined, I should be greatly obliged if some brother gas man would put me in the way of ferreting them out.

Yours obediently,

GEORGE WALKER.

Late Newspaper Statistics Concerning Gas Matters.

MACON, GA., August 25, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

I enclose a couple of clippings which have been taken from the columns of our local newspaper, as they appeared in one of its recent weekly issues, and I forward them to you for publication, as pretty fair samples illustrative of the carelessness, inaccuracy, and general unfairness with which these "farmers of public opinion" treat the business of the gas maker; indeed, I might go further and say that the illustration might be extended so as to embrace *any* and *all* questions of domestic economy which the public prints are so fond of intermeddling with.

The first of the clippings relates to the comparative cost of gas and electricity as mediums for the lighting of streets, and is as follows:

"The cost of electric light for the illumination of cities, as compared with gas, has been computed at Hartford, Conn., where arc lights have been in use for about a year. The report states that each electric light in use displaces six and one-half street gas burners, besides giving at the same time at least ten times as much light. The gas lamps cost $85 per burner per annum, kept burning 326 nights in the year; while for the electric lights 65 cents a night is paid. The electric light being equal to six and one-half gas burners, a saving of $15.60 per lamp per year is effected by the use of electricity, besides the cost of lighting and extinguishing the gas lamps."

Taking the data given as true, I find the equivalent cost of electricity per gas burner to be $32.60 per annum; therefore, if each gas burner costs $85, the saving in favor of electricity would be $52.40, instead of $15.60 per lamp. Of course, no such price is paid for street lamps in Hartford, Conn., or any other city. I do not know the exact price paid there, but would be perfectly willing to contract for lighting them at a sum not far from $20 per lamp per annum. Now, taking that price as nearer the truth than the $85 figure, I find the saving in favor of gas to be $12.60 per lamp per annum.

Concerning the wild statement that each electric light, while displacing 6½ gas lamps, gives ten times the amount of illumination afforded by the gas lamps so displaced, I would only say that in such case the Hartford Board of Aldermen, as a municipal body, is very improvident in its disposition of the people's money. They could give the city double the amount of light that it has been formerly accustomed to receive, and still displace 32½ gas lamps with one electric light—thus saving the taxpayers $13.48 per gas lamp per annum.

[We do not wish to say one word in defence of the "newsmen," who are ever ready and willing to publish as true the worst kind of trash when dealing with questions of public economy, and, as our correspondent justly says, more particularly when these questions hinge in any degree upon a consideration of the manufacture and distribution of gas. In the clipping given above we should imagine that the proof-reader is largely to blame for the extravagant figures given; but still the average newspaper subscriber will hardly bestow enough attention on the matter to get at the true state of affairs, and is more than likely to throw up his hands in holy horror at this "terribly striking example of the exactions of a grinding monopoly." In 1883 the price obtained by the Hartford (Conn.) Gas Light Company for gas supplied to the public street lamps, was at the rate of $1.80 per thousand cubic feet. In the schedule for that year the total number of hours each burner was to remain lighted was 3,457½; the burners being rated for a consumption of four feet per hour, it necessarily follows that each street light would consume 13,831 cubic feet per annum, and the cost of the same (at $1.80 per thousand) would be $24.88—this being exclusive of any charge for lighting, cleaning and maintaining. We have not received a copy of the Hartford Company's street lighting contract for the current year, but are under the impression that, as private consumers are now charged at the rate of $1.80 per thousand, the gas supplied to lamps and public buildings is supplied at $1.70. There is one thing certain, and it is that Mr. Harbison believes in the policy of cheap gas rates; and we are inclined to think that our correspondent's $20 per post per annum figure will soon be reached at Hartford.—ED.]

The second clipping relates to the cost of "Sawdust Gas" at Deseronto, Ontario. In this "news item" I find it stated that "Deseronto, Canada, is lighted by gas made out of sawdust under the Walker process. It is claimed that the works show a product of 300,000 feet of gas out of thirty tons of sawdust, at a cost of $100, with bye products of an aggregate value of $101, making the net cost of the gas equal to $5, or 1.66 cents per foot."

Here is a problem for a schoolmaster. If 300,000 cubic feet of gas costs $100, and the residuals return $101, or one dollar above the total cost of manufacture, how can the net cost be $5, or how can one foot of the gas sost 1.66 cents, or the 300,000 feet cost $5,000? And if the 300,000 feet be set down as costing $5,000—or $16.66 per 1000 feet—how does that help us toward selling gas at one dollar per thousand, and paying a dividend besides?

Such articles as those above given can only be accounted for on the ground that they were produced by the joint efforts of a maniac writer, an inebriated type-setter, and an imbecile proof-reader.

Respectfully,

A. E. BOARDMAN.

[The clipping last given ought to afford considerable amusement to those of our readers who have followed the recent series of articles on "Sawdust Gas," contributed to our columns by Messrs. Walker and Bicknell (both of the gentlemen named being thoroughly qualified to discuss the subject in all its bearings), the concluding portion thereof appearing in our issue of August 16. All things considered, Mr. Boardman appears to have set out a "problem for a schoolmaster," but the last paragraph of his letter undoubtedly places the responsibility of the wonderful collection of figures given where that responsibility properly belongs.—ED.]

Gas Engines and Exhausters—An Answer to "C. C. G."

OFFICE OF LACLEDE GAS WORKS,
MAIN AND HOWARD STS., ST. LOUIS, MO., Aug. 20, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In reply to your invitation (in your August 16th issue) to give information as to experience gained in the use of gas engines for running exhausters, the writer, with your permission, would state the following:

We had an "Otto Silent Gas Engine," which was rated as a seven-horse power one, and it was employed to drive a Mackenzie exhauster. This exhauster frequently had occasion to pass over a million feet of gas in twenty-four hours; and, I must say, whether doing duty at the highest or lowest pitch of working, the engine always performed its operations faithfully and satisfactorily. The gas indicator cards were better than when we were operating our steam engine; although, speaking with strict justice, that should be in a great measure attributed to the excellent working of the Mackenzie compensator attached to the exhauster, as the engine made the same number of revolutions whether much or little gas was being produced. The engine required but very little care or attention, and at last was displaced by a steam engine only because we were obliged to have steam power, with engineers and firemen, for other purposes, whether we operated the exhauster with a gas motor or not. From that circumstance it can readily be understood that there was little economy in consuming good gas when coke-breeze—which we could not sell at any figure—was plentiful, and good enough for utilization as a fuel for all our purposes.

Yours truly,

FREDERIC EGNER, Engineer and Supt.

Running an Exhauster with a Gas Engine.

DENVER GAS COMPANY,
DENVER, COLORADO, August, 24, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In your issue of August 16th (page 96), "C. C. G." requests those having had experience in running an exhauster with a gas motor to speak out.

I have run a ten-inch exhauster with a two-horse power Otto gas engine for a period of over four years, and can assure the gentleman that the work is done to perfection. In fact, the work is accomplished much better than when a steam motor furnishes the power employed.

Respectfully,

WILLIAM J. FAY, Superintendent.

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TUESDAY, SEPTEMBER 2, 1884.

Gas Stoves on Hire.

Mr. Norton H. Humphrys, in an article contributed to the *Gas Engineer*, makes (among others) the following remarks on the above subject:

In a previous number of your paper I referred to the subject of "Day Pressure;" and now, in response to one or two suggestions made respecting that paper, would take the opportunity to add, as a sort of appendix, some considerations on the above subject. It is unnecessary to occupy space in illustrating the advantages to be gained by the adoption of a system of letting stoves on hire, seeing it has now become so general, that the advisability of such is not likely to be questioned. But, in order that these advantages may be secured, attention to a few points is necessary. In the first place it must be understood that the stove letting is not undertaken as a source of profit in itself, but that the increased gain is to be looked for in the direction of an increased sale of gas; and, therefore, a rent only sufficient to pay for depreciation, and, at the same time, to yield a moderate interest on the capital invested, is to be charged. As a general rule, for gas cooking apparatus, this rent may be founded upon 12½ per cent. on the ordinary retail price of the stoves; a stove, the gross price of which is £4, may be let at a hire of 10s. per annum, and so on. And now that stoves are being introduced, in which the iron is protected from rust by enameling and by other improvements, a considerable increase of durability is secured, it may be found possible to reduce this rate; which should certainly be done if circumstances admit. With the best means of collecting this charge we shall presently deal; but it is well to stipulate that in no case will a stove be fixed on hire for less than one year. If any customers prefer to purchase stoves, every facility should be offered for their doing so; it being remembered that the object in view is to get customers to use the stoves, and that it is immaterial whether they hire or purchase, so long as they use them. The hiring system is only introduced to meet the convenience of those who are not in a condition to spend some few pounds, or perhaps do not feel inclined to do so, on what appears (in their eyes) a rather doubtful experiment.

Having decided to take up the plan of letting stoves on hire, the first question is, "What is the best kind to purchase for that purpose?" The principal considerations are durability and simplicity; strength to stand rough usage, and freedom from anything in the way of complicated parts, which might lead to accidents in the hands of simple or careless persons. For several reasons it is well to limit the hiring stock to as few different sizes and sorts of apparatus as possible. The fitters, who have the fixing of the apparatus, will then acquire a full knowledge of the supply of gas required, and the various peculiarities of each kind. Also an intelligent gasfitter, who has a knowledge of metal working, will be able to re-case stoves, and effect nearly all the necessary repairs—especially if an arrangement be entered into for a supply of parts of stoves—at the gas works, thus avoiding the delay of sending to the makers, the cost of carriage, and risk of breakage, etc. Care should be taken to select a description of apparatus that is best suited to the requirements; and having selected it, to keep to that make of apparatus. Accidents sometimes happen from turning the wrong taps. So care should be taken to see that the various taps are distinct from each other, and not so placed as to cause any confusion as to which burner a certain tap supplies; and especially that the tap supplying the oven burner is well distinguished, or, better still, placed at a different level from the boiling burner taps. It is also indispensable, as I have already pointed out, that the apparatus should be effective at a low pressure, so that the day pressure at the works may be kept within reasonable limits.

In small districts the work of fixing the stoves will fall to the service-layer. But when the district is large enough, it will be found preferable to set a fitter apart entirely for the work of fixing and repairing stoves. In what I may call the "small medium-sized" works a man who also understands blacksmithing will be found very convenient for this work, since the demand for cooking stoves arises principally during the summer, just at the period of the year when the need of repairs to the retort house tools, etc., is less; his attention can then be principally devoted to the stoves during the summer, and to the ordinary repairs during the winter. But in any case the man who has the fixing of the stoves should be both a competent and a careful workman (the two qualities are not always combined in the same individual), for any complaints of insufficient supply, or leakages, etc., not only cause a great deal of unpleasantness, but tell against the increased use of the stoves. Too much care cannot be taken to see that the boiling burners, one at least of which is in the general way used several times a day, will burn without smoke or smell. In any case it is well for the manager, or some responsible person from the gas works, to inspect each stove after it is fixed.

Careless Installation of Electric Wires.

A recent number of the *Electrical Review* says: "We have seen wires in many cities, and have noted their condition carefully, but in no city in the country have we seen so much poor work as in the city of New York. In the matter of electric light wires this is especially notable. They have been put up, in many instances, in a slovenly, haphazard way, with no regard for symmetry, and with little or none for safety. The idea seems to have been to "get there," no matter how; and the "how" has often been remarkable in the extreme. We have always held, and still hold, that an electric light wire, properly put up, is an element of danger to life or limb so small that it is not worth talking about; but we have insisted that the work should, in all cases, be properly done, that reasonable conditions should be insisted upon, and that companies should be held to a strict adhesion to proper rules. When wires cross streets it should de at not less than a certain prescribed height, and extra care should be used in securing them on either side. In this respect the wiring in this city is peculiarly bad. Again, wires should be constantly inspected, to see that the insulating covering is intact. Instances are by no means infrequent in New York where the insulating covering, worn away by friction against other wires, hangs in ragged shreds, exposing the bare copper to contact with neighboring wires, and offering an excellent opportunity for accident. Some day a serious accident will result from this slovenly and careless work, and then a great howl will go up against overhead wires, not only in New York, but all over the country. It can easily be prevented by a little reform now, and it is eminently desirable that the work should be done."

The Market for Gas Securities.

The market for city gas shares, since our last issue, has presented not much in the way of animation, although prices have been fairly well maintained, and one or two classes of stock are recorded as being bid for at higher figures. Those who tried to depress Equitable stock did not meet with much success as a consequence of their efforts; the contrary effect really occurring. Equitable shares are now quoted as offered at 100, the bid price being 92. These are the highest quotations made for the stock during the last six months. While on the subject of the Equitable Company, we might mention that it has appeared on the street as a borrower of money, wherewith to complete building operations. The company has decided to issue a first mortgage loan in the sum of one million dollars, to mature on August 1st, 1899; the bonds are to carry 6 per cent. interest, payable semi-annually in months of February and August of each year. Of this one million dollars we understand that $400,000 was placed among the stockholders, and that the remaining portion is now in the hands of Treasurer J. D. Vermilye, who invites sealed proposals for the whole or any part thereof. The bids will be received until noon of Thursday, September 4th, and should be addressed to Mr. Vermilye, at the Merchants' National Bank, No. 42 Wall street. The Central Gas Light Company, of New York city, has had the misfortune to lose one of its leading spirits in the death of Director Horace P. Whitney. Mr. Whitney was what might be termed a splendid fellow in every sense of the term. He had long been a sufferer from lung troubles, and was obliged on that account to spend most of his time in the South. He was at one time in the newspaper business, having owned, and partially managed, the New York *Sunday Mercury*, a paper that a few years ago had a very large circulation. His death occurred on August 23d.

Brooklyn city gas shares are fairly steady, Williamsburg gas being notably strong. It appears that Contractor Devlin's Equity Gas Light

Company project has been revived, and the chances are that the scheme may go ahead after all. Poor Brooklyn! will they never let you alone? Out-of-town advices are absolutely *nil*. Changes in values are few and far between. For regular quotations see below.

To Render Corks Impervious.—To render corks impervious to air, acids, alkalies and corrosive liquors generally, boil them for some time in melted paraffine. They must be kept under the surface of the melted material, and should be heated and allowed to cool several times, so as to get all the air out of the pores. Corks thus treated cut easily and make very close joints.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & Co.)

34 Pine Street, New York City.

Sept. 2.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Central	$466,000	50	75	90
Equitable	2,000,000	100	92	100
Harlem	2,000,000	50	121	123
" Bonds	170,000		—	—
Manhattan	4,000,000	50	306	303
Metropolitan	2,500,000	100	232	235
" Bonds	658,000	—	107	110
Mutual	3,500,000	100	125	127
" Bonds	1,500,000	1000	104	106
Municipal	3,000,000	100	205	207
" Bonds	750,000		107	110
New York	4,000,000	100	162	165
Northern	125,000	50	—	80
" Scrip	108,000			
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	127	129
Citizens	1,200,000	20	90	93
" S. F. Bonds	320,000	1000	106	110
Fulton Municipal	3,000,000	100	142	145
" Bonds	300,000		104	108
Peoples	1,000,000	10	75	80
" Bonds	290,000	—	105	110
" "	250,000	—	90	95
Metropolitan	1,000,000	100	92	94
Nassau	1,000,000	25	102	107
" Ctfs	700,000	1000	85	90
Williamsburgh	1,000,000	50	120	—
" Bonds	1,000,000	—	104	108
Richmond Co., S. I.	300,000	50	—	75
" Bonds	40,000	—	—	—
Out of Town Gas Companies.				
Buffalo Mutual, N. Y.	750,000	100	80	85
" Bonds	200,000	1000	95	100
Citizens, Newark	918,000	50	100	105
" " Bonds	124,000	—	105	110
Chicago Gas Co., Ills			150	155
Cincinnati G. & C. Co.			187	190
Consolidated, Balt.			51½	52
" Bonds			110	111
Central, S. F., Cal.			52½	62½
Capital, Sacramento, Cal.			—	59
Hartford, Conn.	750,000	25	116	120
Jersey City	750,000	20	145	150
Laclede, St. Louis, Mo.	1,600,000	100	100	—
Louisville, Ky.	1,500,000	50	116	120
Montreal, Canada	2,000,000	100	186	187
New Haven, Conn.		25	166	170
Oakland, Cal.			28	29
Peoples, Jersey City		—	75	80
" " Bonds			—	—
Paterson, N. J.		25	96	99
Rochester, N. Y.		50	75	80
Washington, D. C.	2,000,000	20	185	195
Wilmington, Del.		50	178	190
Yonkers		50	—	40
St. Louis, Missouri	600,000	50	—	538
San Francisco Gas Co.				
San Francisco, Cal.			52	53

Advertisers Index.

Page

GAS ENGINEERS.
Jos. R. Thomas, New York City ... 138

GAS WORKS APPARATUS AND CONSTRUCTION.
James R. Floyd, New York City ... 137
T. F. Rowland, Greenpoint, L. I. ... 135
Deily & Fowler, Phila., Pa. ... 135
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 135
Stacey Mfg. Co., Cincinnati, Ohio ... 135
Bartlett, Hayward & Co., Baltimore, Md. ... 135
Morris, Tasker & Co., Limited, Phila., Pa. ... 135
Davis & Farnum Mfg. Co., Waltham, Mass ... 129
Tanner & Delaney Engine Co, Richmond, Va. ... 135

GAS AND WATER PIPES.
A. H. McNeal, Burlington, N. J. ... 134
Gloucester Iron Works, Phila., Pa. ... 134
R. D. Wood & Co., Phila., Pa. ... 129
Warren Foundry and Machine Co., Phillipsburgh, N. J. ... 134
Mellert Foundry and Machine Co., Reading, Pa. ... 134

SCRUBBERS AND CONDENSERS.
G. Shepard Page, New York City ... 133

REGENERATOR FURNACES.
Charles F. Dieterich, Baltimore, Md. ... 49
Aug. Klonne, Dortmund, Germany ... 130

RETORTS AND FIRE BRICK.
J. H. Gautier & Co., Jersey City, N. J. ... 132
B. Kreischer & Sons, New York City ... 132
Adam Weber, New York City ... 132
Laclede Fire Brick Works, St. Louis, Mo ... 132
Brooklyn Retort and Fire Brick Works, Brooklyn, N. Y. ... 132
Borgner & O'Brien, Phila., Pa. ... 132
William Gardner, Pittsburgh, Pa. ... 132
Henry Maurer, New York City ... 132
Chicago Retort and Fire Brick Works, Chicago, Ills. ... 132
Baltimore Retort and Fire Brick Co., Baltimore, Md. ... 132
Standard Gas Retort and Fire Brick Co., Ironton, Ohio. ... 132
Oakhill Gas Retort and Fire Brick Co., St. Louis, Mo. ... 132

GAS STOVES.
American Meter Co., New York and Philadelphia ... 131
The Goodwin Gas Stove and Meter Co., Philadelphia, Pa. ... 140

VALVES.
Ludlow Valve Manufacturing Co., Troy, N. Y. ... 124
McNab & Harlin Mf'g Co., New York City ... 100
John McLean, New York City ... 128

GAS METERS.
Harris, Griffin & Co., Phila., Pa ... 138
American Meter Co., New York and Philadelphia ... 139
The Goodwin Gas Stove and Meter Co., Phila. Pa. ... 139
Helme & Mellhenny, Phila., Pa. ... 139
Maryland Meter and Mfg. Co., Baltimore, Md. ... 138
D. McDonald & Co., Albany, N. Y. ... 139

EXHAUSTERS.
P. H. & F. M. Roots, Connersville, Ind. ... 138
Smith & Sayre Manufacturing Co., New York City. ... 136
Wilbraham Bros., Philadelphia, Pa. ... 136

GAS COALS.
Penn Gas Coal Co., Phila., Pa. ... 137
Perkins & Co., New York City ... 136
Newburgh Orrel Coal Co., Baltimore Md ... 137
Despard Coal Co., Baltimore, Md. ... 137
Chesapeake and Ohio R.R. Coal Agency, N. Y. City. ... 137
Westmoreland Coal Company, Phila., Pa. ... 137

GAS ENGINES.
Schleicher, Schumm & Co., Phila., Pa ... 112
Continental Gas Engine Co., New York City ... 101

GAS LAMPS.
Siemens Regenerative Gas Lamp Co., Philadelphia, Pa. ... 133
G. Shepard Page, New York City ... 137

PURIFIER SCREENS.
John Cator, Lawrence, Mass. ... 100

STREET LAMPS.
J. G. Miner, Morrisania, New York City ... 99
Bartlett Street Lamp Mf'g Co., New York City ... 128
Geo. D. Winchell Mf'g Co., Cincinnati, Ohio ... 128

BURNERS.
G. Gefrorer, Phila., Pa. ... 134
Walter Anderson, New York City ... 134

PURIFYING MATERIAL.
Connelly & Co., New York City ... 139

STEAM BLOWER FOR BURNING BREESE.
H. E. Parson, New York City ... 128

GAS FIXTURES.
Mitchell, Vance & Co., New York City ... 137

STEAM ENGINES.
Westinghouse Machine Co., Pittsburgh, Pa. ... 127

STEAM PUMPS.
Guild & Garrison, Brooklyn, N. Y. ... 128
A. Y. McDonald, Chicago, Ill. ... 138

PIPE CUTTING MACHINE.
Pancoast & Maule, Philadelphia, Pa ... 138

HYDRAULIC ELEVATOR.
Lane & Bodley Company, Cincinnati, Ohio. ... 127

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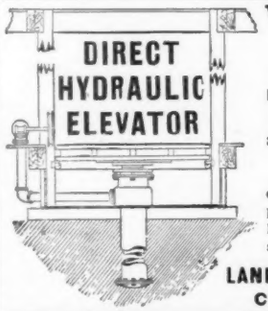

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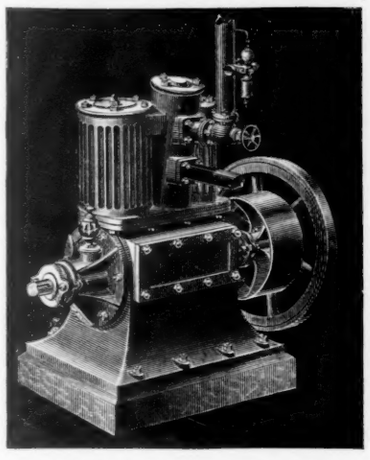

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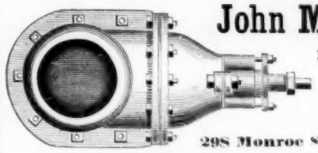

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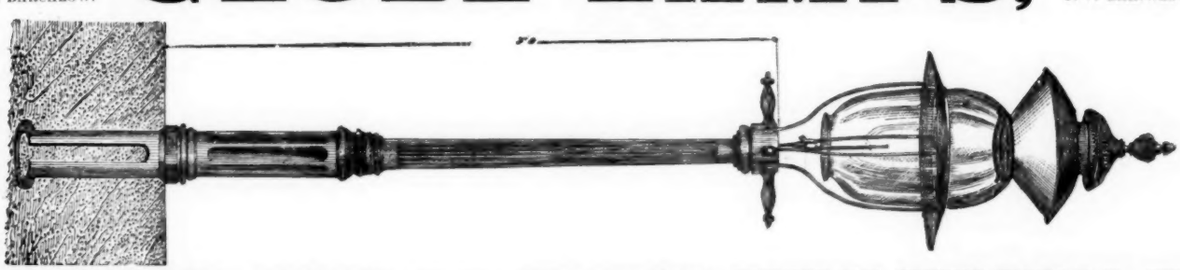

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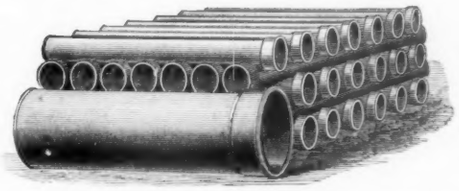

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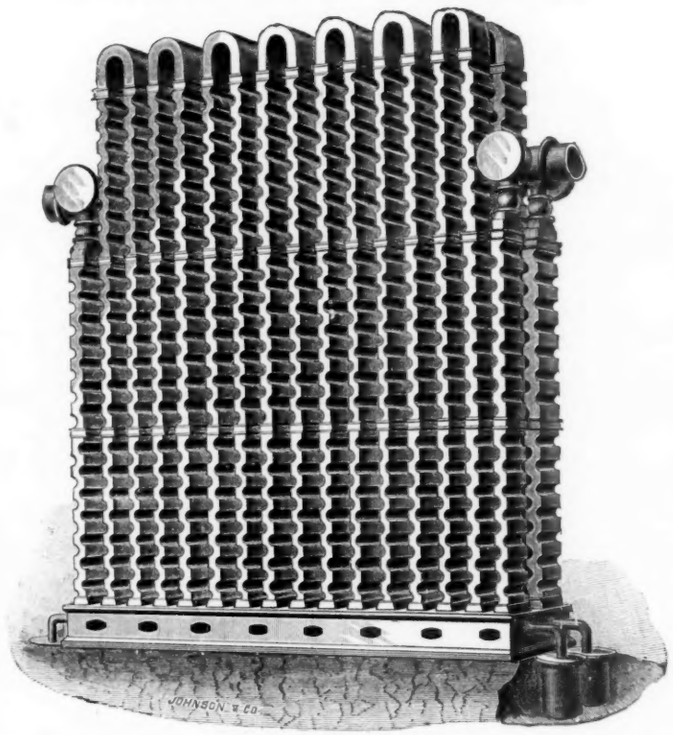

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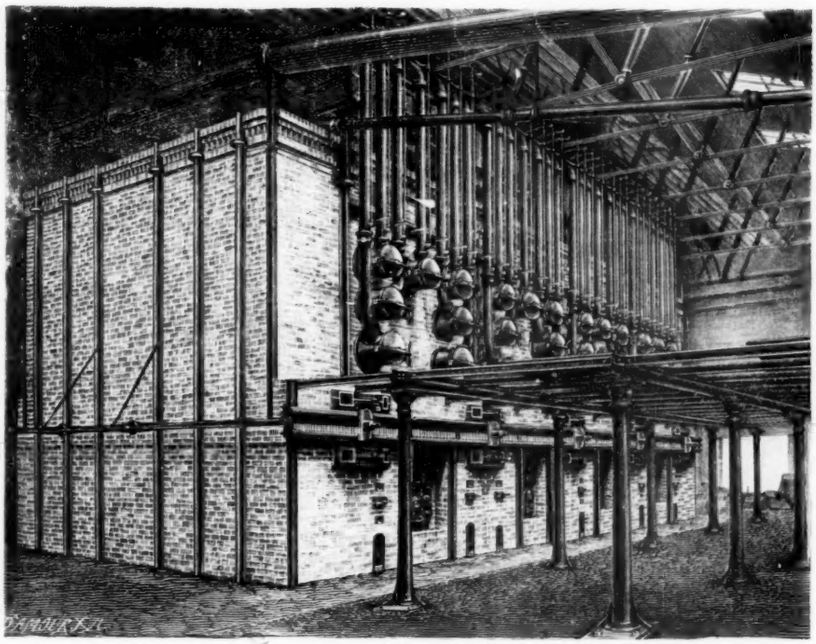

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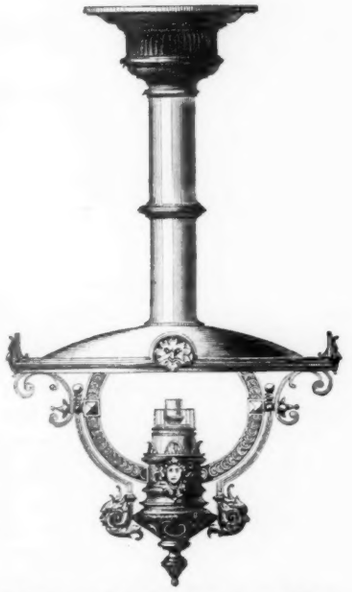

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1884	26,177,500	"
Total	235,937,500	cubic feet.

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	Number.	Cubic Feet per Day.
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Australia	18	12,150,000
New Zealand	2	650,000
France	6	4,550,000
Belgium	8	5,420,000
Germany	16	8,200,000
Holland	4	4,160,000
Denmark	1	150,000
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Cokerei der Friedenshutte, Upper Silesia	700,000
Dumfries Corporation	250,000
Dunedin Gas Co., New Zealand	400,000
King's Lynn Gas Co	300,000
Leiden, Holland	600,000
Lincoln Gas Co	400,000
Liverpool Gas Co	2,000,000
" "	3,000,000
LOUISVILLE GAS CO.	1,500,000
Numea Gas Co	100,000
PITTSBURGH GAS CO	1,500,000
PORTLAND GAS CO., Oregon	562,500
SAN FRANCISCO GAS CO	2,000,000
" "	2,000,000
Sheepbridge	40,000
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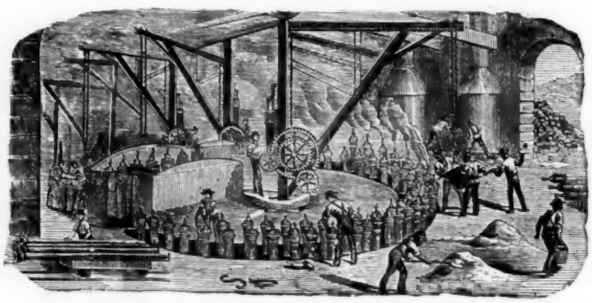

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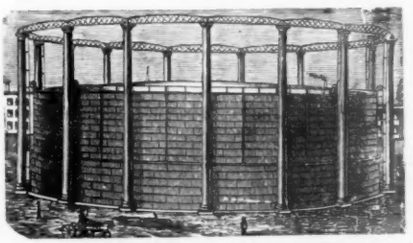

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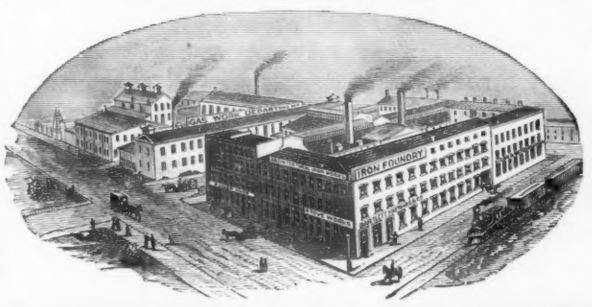

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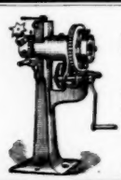

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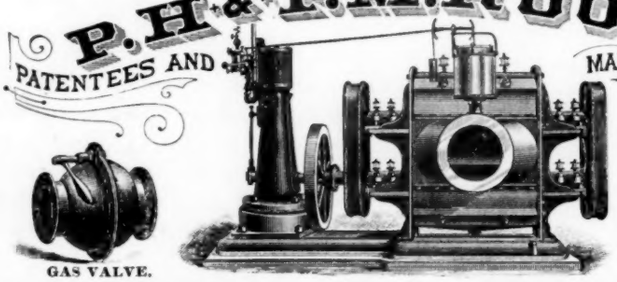

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